MOTOR AGE

Vol. XXX
No. 14

CHICAGO, OCTOBER 5, 1916

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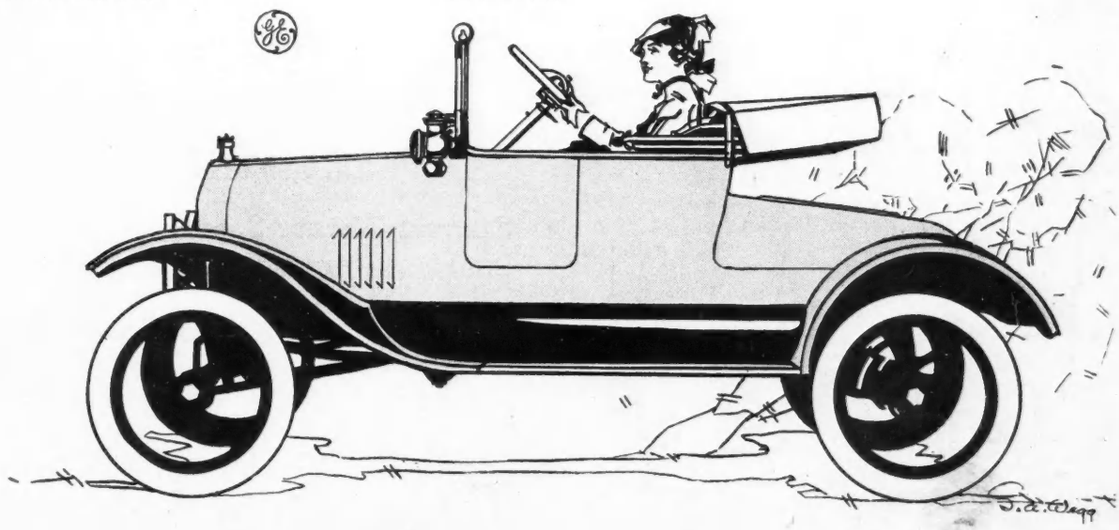

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Published Every Thursday by the
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Mallers Building
CHICAGO ILLINOIS

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, Under Act of March 3, 1879—Member of the Audit Bureau of Circulations. Circulation Audited and Verified February, 1916—Copyright by the Class Journal Co., 1916. Published every Thursday.

United States, Mexico and U. S. Possessions.....One Year $3.00
Canada.....One year $5.00; All Other Countries in Postal Union....One Year 6.00

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SUBSCRIPTIONS received up to the 15th of the month begin with first issue of that month; those received later, start with first issue of following month.

RENEWALS or CHANGE OF ADDRESS should be sent two weeks in advance of date they are to go into effect. Be sure to send old as well as new address to avoid unnecessary delay. RECEIPT of first copy is acknowledgement of subscription.

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ANNOUNCEMENTS

In next week's issue you will find a resume of the motor car offerings for the 1917 season. Mechanical developments and changes in body lines and equipment will all have a part in the story. This has been the greatest production year for motor cars in the history of the industry and the influence has been to produce a car of minimum complexity and maximum service.

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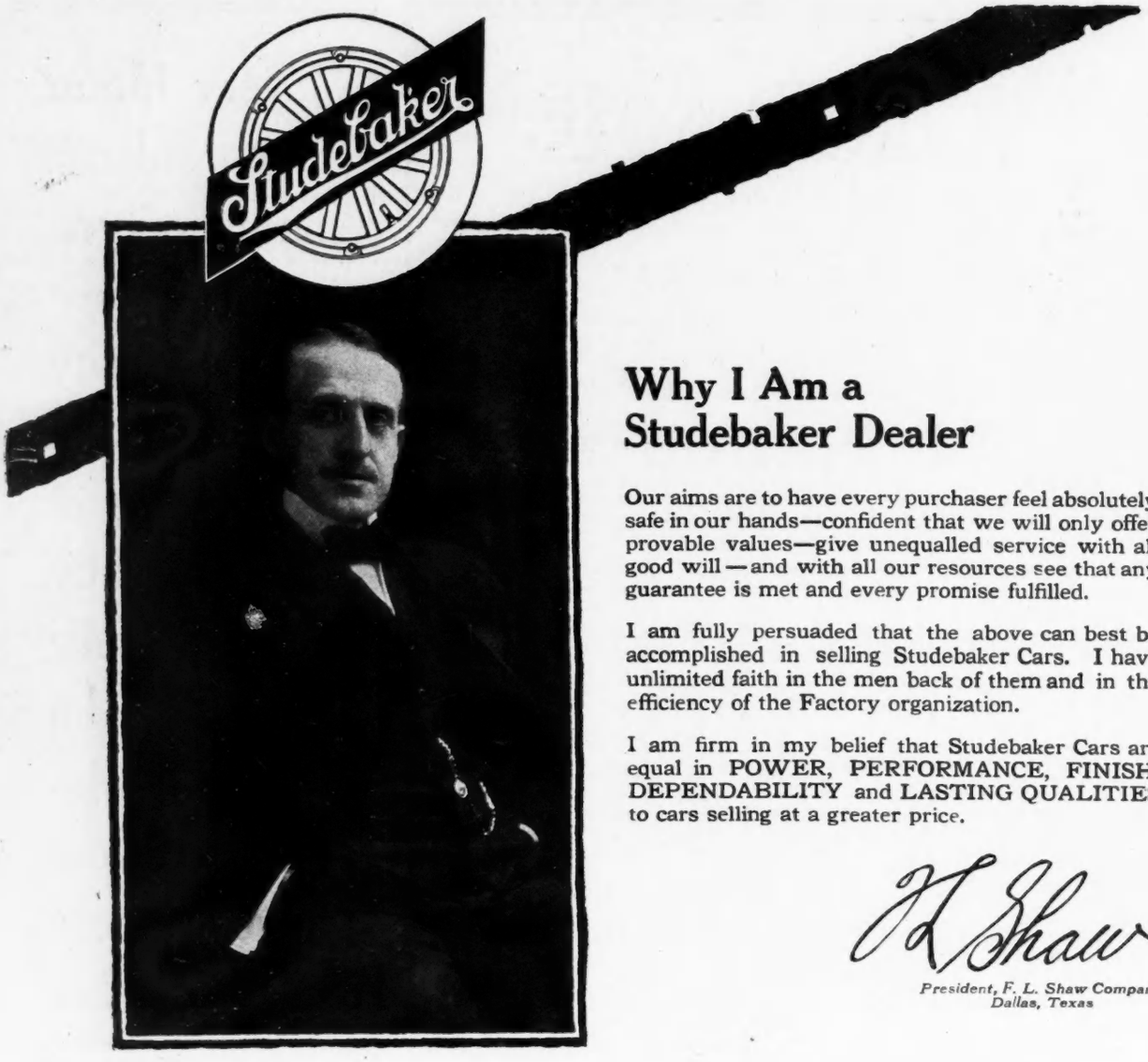

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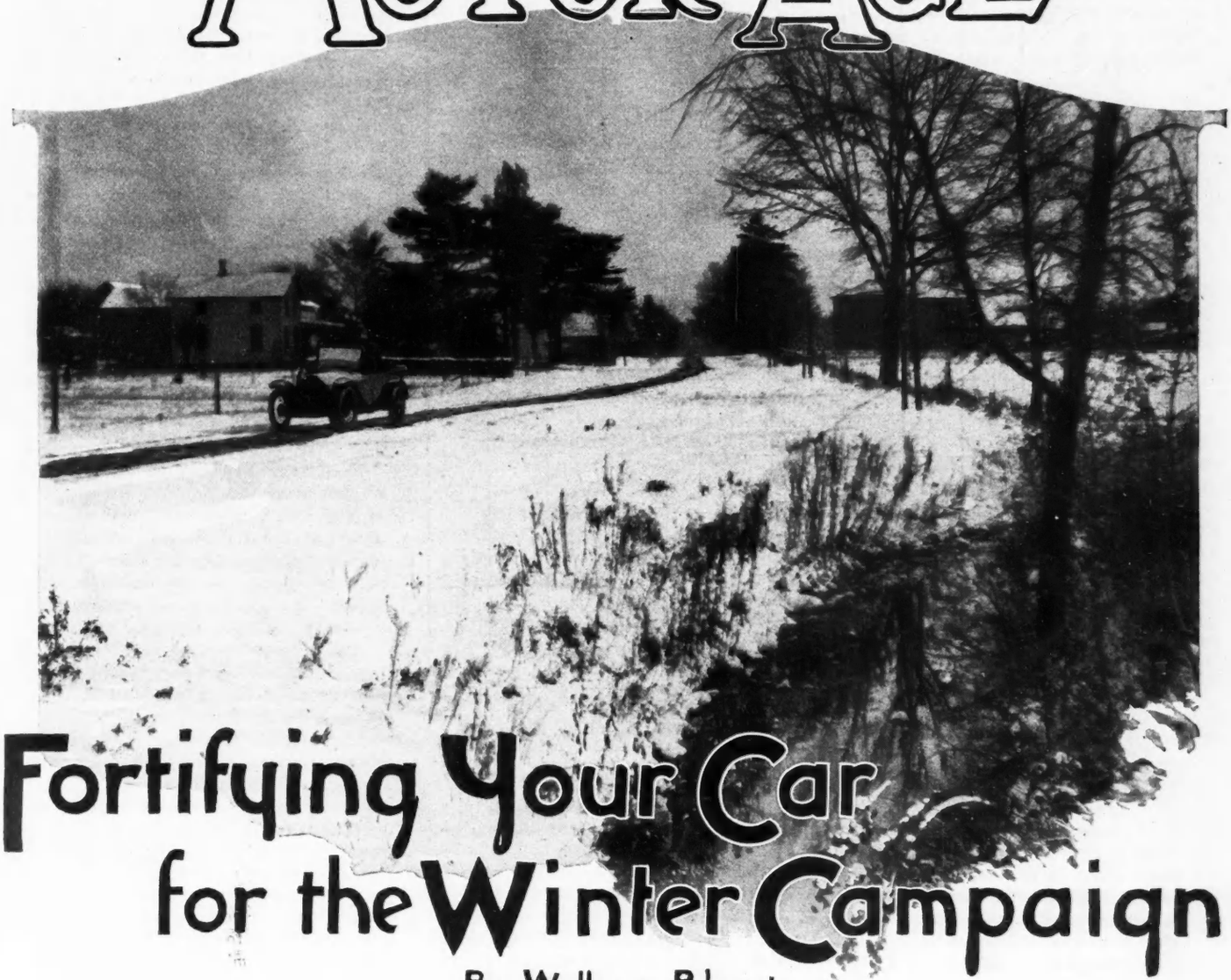


Fortifying Your Car for the Winter Campaign

By Wallace Blood

How to Avoid the Discharged-Battery Bugbear by Beforehand Preparation

EDITOR'S NOTE—This is the first of a series of articles in which the various phases of preparing a car for the winter season will be discussed. Certainly there is no more exasperating situation than to have a car go wrong on a snow-covered road with the thermometer hovering around the zero mark, and beforehand preparation of the car and its equipment is well worth while. The motor, the tires, the body; in fact, the entire car, should all be given a due amount of attention. There will also be articles on heaters, radiator covers and cold weather clothing, some of which will be found under the department heads of Motor Age.

IN THE average electrical starting system it takes twenty times as long to make up the current consumed from the battery that it does to draw it out with the starting motor in action. In other words, if, on a cold winter morning, you keep your foot on the starting pedal for 3 minutes before the motor finally fires, your car must be driven at charging speed, with no lights on, for an hour in order to put the battery back in the same condition of charge that it was before you attempted to start your motor.

With the business men driving their cars to work on a dark winter morning and back home again on a dark winter evening, lights being a necessity, it is little wonder that so many of them are hoodooed with the discharged-battery bugbear. Suppose a man turns his motor over for 2 minutes in the morning to start it. That means that the car must be driven in the neighborhood of fifteen miles an hour for 40 minutes to get back the charge. His office is only 5 miles away. He uses his lights, consuming about half of the charging current. He drives the 5 miles in 20 minutes. With the lights on he has only put back about a fourth of the current consumed in starting the motor. If this is continued for a week or two his battery becomes dead and he wonders why.

An ampere is like the flow of a river. It signifies the rate of current flowing from the battery. The current drawn in starting a motor is little short of marvelous. In the average system a momentary

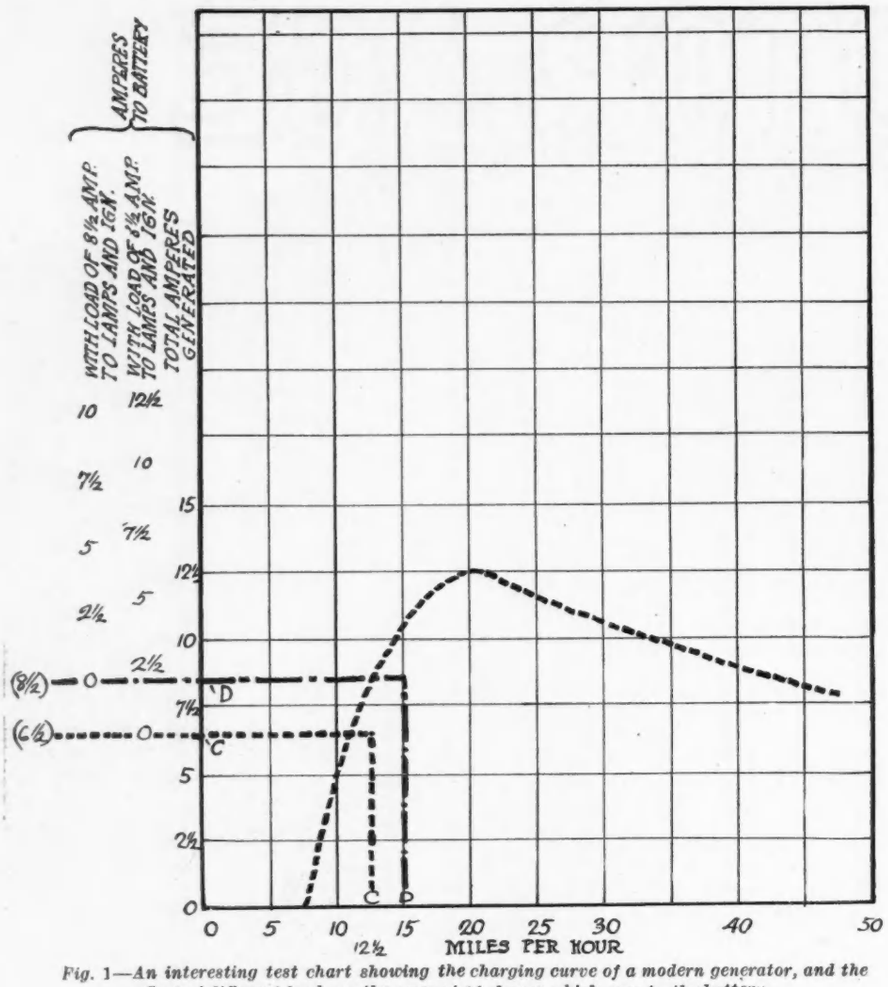


Fig. 1—An interesting test chart showing the charging curve of a modern generator, and the effect of different loads on the amount of charge which goes to the battery

draw, at the time when the starting motor has to overcome the greatest resistance, which is generally at the instant that the motor starts to revolve, sometime reaches as high a figure as 200 amperes. Of course this draw drops down to a great extent after the motor is in operation.

Suppose you have a lighting system of 30 candlepower. The average draw for 30 candlepower is 8 amperes. I have seen cars which have had a draw of 35 amperes with all lights on. In a system which draws 8 amperes, which is about the ideal condition, there is still a 1- or 2-ampere charge going to the battery when the generator is charging. With the amperage much above this, there is a dead draw on the battery, and with winter driving there is practically no chance of keeping the battery up where it belongs.

Let these figures stand as proof that the electrical system must be literally handled with silk gloves in the winter time. It is purely a matter of making beforehand preparation and spending a few hours a week through the winter months to keep the discharged-battery wolf from the door. It is not the fault of the electrical systems. When cold weather sets in you buy yourself an overcoat, a heavy hat, high shoes, wooleys and other cold weather appurtenances; you buy coal to keep your house warm and you shovel that coal into the furnace morning and night to keep yourself and your family comfortable. It is no more than fair that you should give the electrical system of your car the same consideration. You should spend some money on getting it ready for winter and spend some time in keeping it in condition. After all, the preparation expense will fall short of what the recharging bills would come to.

To keep your battery properly charged in winter the following points hold the upper hand: The generator must be set at the proper charging rate, it must be properly oiled, the commutator must be clean and free from mica, the brushes must seat evenly throughout their surface, the starting motor must be oiled, the storage battery must be internally correct, that is, the plates must be free from sulphation and buckling; the battery must be properly cared for at proper intervals with a supply of water and a hydrometer inspection, and last and probably most important of all, the carbureter must be set so that the motor will start readily, some kind of a device must be attached to facilitate starting or at the least some regular procedure must be gone through to make the motor start on the first two or three turns, regardless of the degrees of temperature.

When it comes to determining the proper charging rate of a generator, or whether a generator is charging as fast as it should, or cutting in at the proper time, the owner can find that out for himself, but when it comes to stepping up the regulator, it is strongly advised by every maker of electrical systems that the owner leave the repair to the factory or to a service station. It is a ticklish job in its simplest form and the owner will profit by expert advice.

Are You Sure the Generator Charges?

Sure methods of determining whether the generator is properly delivering current to the battery under normal running conditions are:

When the car is equipped with an ammeter, this instrument will show charge when a speed of about 12 miles per hour has been reached. If the battery does not get a charge at this speed, or at least at 15 miles per hour, the nearest electric service station should be called upon for a readjustment of the regulator.

When the car has no ammeter, there is no easier way than to drive the car down a quiet street, after dark, note the brilliancy of the lights when driving very slowly, then speed up to from 12 to 15 miles per hour. If the lights brighten slightly the generator is cutting it so it should. If your car goes up to over 15 miles per hour without the lights brightening, the adjustment is wrong and you can never expect to keep the battery charged during the winter driving.

As previously mentioned, dirty commutators materially reduce the charging rate. To inspect the commutators and brushes, it is necessary to remove the cover which encloses them. The commutator and brushes should be put in first-class condition before the winter season starts and should then be inspected every week or ten days to find out their condition. If the commutators are found to be covered with a black substance, high mica, or rough from wear, they may be smoothed down with a fine-grained sand paper in the following manner:

Start the engine and run it at a speed corresponding to a car speed of 15 or 20 miles per hour. Hold a strip of the sand paper with the rough side against the commutator. Press the paper down lightly across the surface of the commutator under the brushes until all its roughness is removed. The copper and sand dust should then be carefully removed with compressed air on a hand bellows.

There is a right way and a wrong way of performing this operation. In the first sketch in Fig. 5 the sand paper strip is shown wrapped about the commutator under the brushes so that the brush presses against a surface of the same radius as the commutator. By drawing the paper back and forth for a considerable period the brush surface will be trued down with the commutator and, if carefully handled a very good seat will be the result. In the

second figure the wrong way is shown. This method will grind the surface of the brush unevenly with reference to that of the commutator. When the brush does not seat firmly on the commutator, the electricity arcs between the uneven surfaces quickly building up another deposit of the high mica and making another repair job necessary within an unduly short length of time. Also the strip of sand paper should pass entirely under the brush as shown in the first sketch at the bottom of Fig. 5. This is the only way an even surface may be made.

A man who does not know just exactly what he is doing should not, under any consideration, attempt to remove and take apart the generator of his car. I have seen a good many cases where novices have tried this and then sent the parts back to the makers to have them put back together again. If your commutator is covered with mica and you are a novice in the repair business, let an electrical man remove the mica. If you know you can tear down the generator and get it back together again properly, the following may be of use to you:

High-Mica Deposits

High mica deposits often fill up the notches on the face of the commutator. This should be cleaned out very thoroughly. Referring to Fig. 3 you will see that a file may be used for this work. The file should be very fine grained and, of course, must be thin to pass into the slots. An ordinary finger nail file may be used successfully. A hacksaw blade will serve equally well as shown in the second figure. Fig. 4 shows the right way and the wrong way of cutting the mica from the grooves. To do the job right all the mica must be taken out, as shown in the first figure. The work will do little good if it is not filed out square.

The mica cannot be removed with the commutator in the car. The generator must be taken apart. If a lathe is available, there is no more satisfactory method of removing the mica from the commutator than to center the whole apparatus in the lathe chuck and grind the surface down evenly with sand paper, a fine file, or with a cutting tool. You must remember that the brush must be fitted accurately to the commutator before the job is a success. As a temporary measure, kerosene is sometimes useful in removing accumulations on the commutator. The coal oil should touch the commutator only and should be wiped off in about 10 minutes with a piece of cheesecloth, the latter in preference to any other because it is comparatively free from lint.

The bearings of the generator and starting motor should be lubricated frequently, every two or three weeks. A light high-grade oil should be used which will not gum after long use. If the drive of the starting motor is a Bendix, you cannot get too much oil on this system.

If it is necessary to remove the generator to prepare it for the winter season, which it surely will be if it has been in service for five or six thousand miles, see that the terminals or wires are properly wrapped with electric insulating tape. This is important, for if these wires should come in contact with each other, or with metal parts of the car, a short circuit may occur, and this will result in the rapid discharge and possible injury to the battery. In disconnecting the wires be sure to tag them properly so that they can be readily identified and replaced in their proper places. Improper connection will damage the system.

In line with the possibility that the owner may decide to do his own work after our suggestions, it might be well that we protect ourselves with a few "don'ts" which may avoid some serious consequences.

Don't replace worn out brushes with others than those supplied by the manufacturer unless you are convinced that they are of a kind and material that will give as much satisfaction as the original kind.

Don't put oil or grease on the commutator of the generator or motor. No lubrication is wanted there.

Don't run your car if, for any reason, the battery is disconnected from the circuit, unless you have cut off the connections between the battery and the generator.

When it comes to the adjustment of ignition relays, and cut-out relays, adjustments of charging rates, testing of field coils, armatures and the use of test points for determining electrical troubles, Motor Age does not consider it advisable to make an attempt to describe the methods of going about it to perform the operations. There are such a variety of systems and these jobs can be most successfully performed with the use of special tools and equipment that can be found only in a well-equipped service station or electrical shop.

Check the Wiring System

The wiring system should be very carefully checked throughout. Worn wires should be replaced. If there is any place in the wire which looks as though it might be weak, capable of allowing the slightest amount of current to escape, it would be economy to replace that wire. A short circuit, no matter how small it is, will quickly run down the battery. Terminals should be carefully examined. If you find that a terminal is connected to the wire merely by twisting the wire about some part of the terminal you would do well to solder the connection.

If your lights have been in for 2 or 3

DO THIS BEFORE WINTER

See that the battery is FULLY charged.

Have the battery examined at a battery service station for buckled plates or corrosion.

Make up your mind to test the battery with a hydrometer as often as ONCE A WEEK.

Check the wiring system of the car and see that all terminals are soldered or made perfectly fast.

Replace any wires which look suspicious. If the wire is worn slightly in the insulation, tape it thoroughly or put in a new wire.

Put in new light bulbs if the old ones have been in for two months or more. Exchange bulbs for ones of less candle power, if possible.

Examine the commutator for high mica. If there is a coating, BY ALL MEANS REMOVE IT or have it removed if you are not capable of doing the job yourself.

Find some means of choking the carbureter, heating the manifold or priming the motor so that it will start in 10 OR 15 SECONDS.

NEVER RUN THE STARTING MOTOR MORE THAN 30 SECONDS. Have some means of starting that will make this unnecessary.

Oil the bearings of the starting motor and generator. DO NOT OIL THE COMMUTATOR.

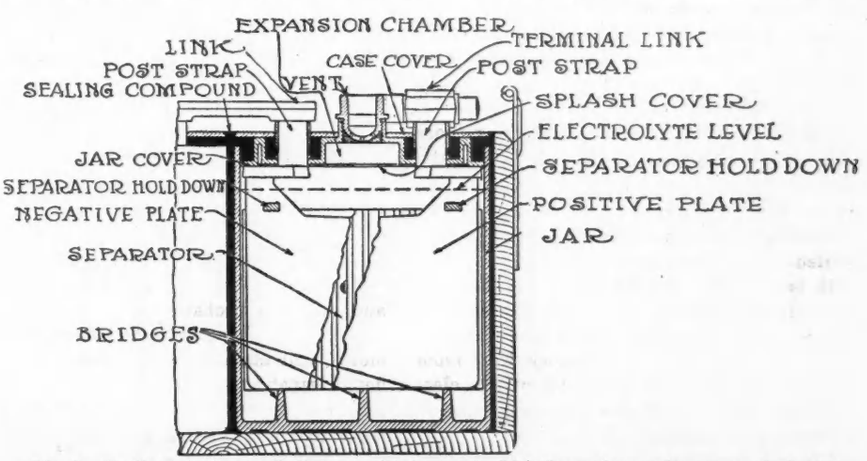
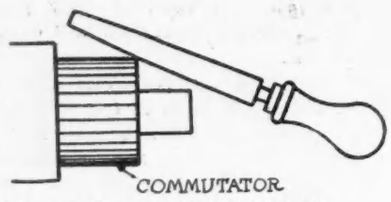


Fig. 2—Section of storage battery, an instrument which does a tremendous amount of work for its size. The dotted line shows the proper electrolyte level



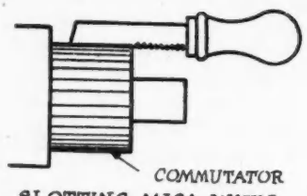


Fig. 3—Two methods of scraping mica deposits from grooves in commutator surface. The first shows a file and the second a hack-saw blade

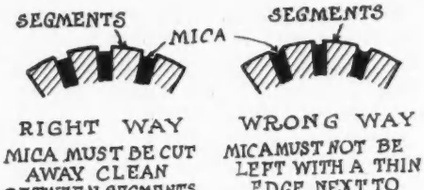


Fig. 4—The mica should be scraped clean from the commutator grooves as shown above. Make the corners square

months change them. In a tungsten light, the maximum efficiency comes at the moment the bulb is inserted in the socket. At the first application of current the efficiency decreases at a surprising rate. In a few months' time a bulb will reduce in efficiency to such an extent that the additional amount of current consumed, say 20 per cent more than the original, would soon pay for a new lamp.

If you are using 4 candle-power lamps in your dimmers you would do well to take these out and put in 2-candle power bulbs. The same is true of the tail light If you can get along without your dash light when you are using your lights morning and night, so much the better. Remember that every little bit of saved "juice" means a higher charged battery.

The Care of Storage Batteries

Your battery must be kept in a full or very nearly full stage of charge throughout the winter months, whether it is in use or lying idle. The table below will give you some idea of the necessity of this, especially if you live in a cold country.

Specific Gravity	Amount of charge	Freezes at
1.280	Full	98 below zero
1.260	¾	60 below zero
1.225	½	38 below zero
1.160	¼	zero
1.150	empty	13 above zero

When a battery freezes it is ruined. Just as any other liquid expands in freezing, so does the same thing effect the acid electrolyte, breaking the plates and jars and making a mess that is beyond economical repair. For the man who drives in cold countries, his salvation lies in the fact that his battery is practically safe when it is one-half charged or over.

In cool weather it is advisable to take gravity readings daily. This hydrometer test is familiar to practically every car owner and does not need explanation. It is enough to say that it is the greatest telltale on the electrical system of any other test, and close observations will often show the existence of a slight trouble which would assuredly turn into a serious one if it were allowed to go on. When you ask too much of the battery you prematurely age it, and this can be avoided by testing it frequently.

Do you know that a good motor car storage battery which measures around 13 by 7 inches and 9 inches high, and weighs only 60 pounds, can deliver over 2,000,000 foot pounds of energy—sufficient to raise its own weight to a vertical height of over 6 miles? Do you know that in cranking an engine, a 50 or 60-pound storage battery must often develop power at the rate of over 2 electrical horsepower? To concentrate such energy in such a small package means that everything must be about right, that there shall be no leakage.

The battery is directly effected by the charging rate of the generator. Refer to Fig 8. Vertical distances in the chart are scaled in terms of amperes. The height at any point shows the current output of the particular generator at the engine speed indicated directly below. Generator B cuts in, that is, starts to charge the battery at 300 revolutions per minute of the engine and then gives an immediate output of 1½ amperes increasing steadily until it generates and maintains a constant current of a little over 13 amperes for 800 revolutions per minute up.

Generator D cuts in but produces no current at 325 revolutions per minute, does not generate 1½ amperes until it attains 350 or 10 amperes until it reaches 850 revolutions per minute of the motor. A generator like that is hard for a battery to get along with. The battery will be naturally starved. Curve B is more nearly ideal.

While still on the subject of curves, refer to Fig. 7. During discharge, the battery voltage gradually falls off and with greater rapidity near the end of the discharge. The chart shows the varying voltage of a typical battery while delivering a constant number of amperes. A study of the chart is ready proof that the battery needs careful care when the discharging rate is great.

It would be well, before the cold weather sets in, to turn your battery over to an electrical man for inspection. If the charge is low let him put it onto a charging circuit and bring it up to maximum. Then put it in your car and endeavor to keep it at maximum. Internal repairs are out of the owner's hands, in practically every case, and should be handled at a battery service station or competent electrical shop.

When a car is to stand idle for any considerable period, that is, if it be laid up for the winter months, the battery may be left in the car, if it is given occasional attention. First of all, one of the battery terminals should be disconnected. This prevents the possibility of any shorts in the electrical system draining the battery.

When a car is to be out of service as long as a month, but less than two, be sure to add water to the cells just before the last time the car is used and endeavor then to run the car in the daylight so that the battery will be as nearly fully charged as possible, the specific gravity of the electrolyte reading between 1.270 and 1.300.

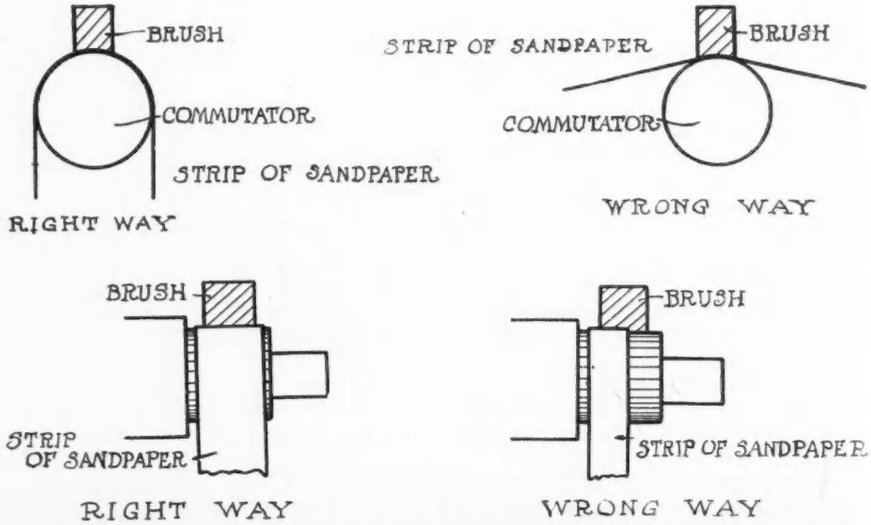


Fig. 5—The commutator may be cleaned and the parts left in good condition, or the commutator surface and brushes may be ruined, depending on how the job is performed

When a car is to be out of service for 2 months or longer, the battery should better be put in a reliable garage where it will receive proper attention. If you desire to keep it in your car, take it to a charging station at the end of the first month, have it filled up and put it back in again.

As an assurance against trouble a battery should not be allowed to stand without a charge for a period to exceed 2 months. Some batteries, put away fully charged and filled with water frequently, have stood 6 months without harm, but this is not practical unless absolutely necessary.

Always add water before putting the battery back in service. It is very advisable to scrape the terminals at this time, or at the time you are preparing your car for winter driving. Corrosion on the terminals will often get so thick that current cannot pass through them, or their efficiency is so reduced that the supply of current passing through is too small to start the motor, or in the reverse direction, to keep the battery properly charged.

The matter of cold weather starting, that is easy starting, depends on a number of different things and hardly falls within the scope of an article on preparing the electrical system for winter use, except for the direct effect of improper adjustments outside of the electrical system, which drain the battery.

Have the Carbureter Right

The carbureter is the one biggest factor which makes starting difficult in the winter. The available grade of gasoline is another hindrance. Carbureters are set by the manufacturers at an adjustment which gives the most economical operation at average driving speeds and this setting is not suitable for starting a cold motor. In cars provided with chokers, these should, of course, be used in every instance. If the car has no choker there should be some means of shutting off the air intake opening. A piece of waste soaked with gasoline and stuffed into the air intake has proved a great help in a number of instances.

If there is any available means of priming the motor, prime it by all means. If the motor is a particularly bad offender for cold weather starting, remove the spark plugs and prime that way. If no suitable carbureter adjustment can be found, if choking and priming do not give a quick start, wet a towel in boiling hot water and wrap it around the intake manifold. Use a turkish towel. It will hold the heat. Leave this on for 3 or 4 minutes. It will heat the manifold and assist vaporization.

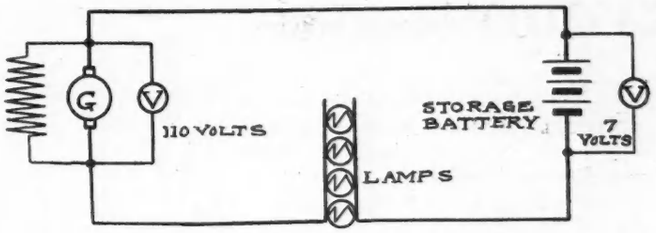


Fig. 6—An example of the drop in pressure from the generator to the storage battery when a resistance is introduced. G is the generator, V voltmeters to show the comparative pressure

Spend 15 minutes, if necessary, preparing your motor for the start before putting your foot on the starting pedal. It will prevent that enormous consumption of electrical energy from the battery, which has been previously described. Use your lights sparingly, the dimmers as much as possible. Fill that battery with water and watch it closely. Make it a sporting proposition and see if, by your own careful attention, you cannot keep the battery on top and beat the garage man out of his charging fee.

ABSORB OVERLAND STOCK

New York, Sept. 30—The $15,000,000 common stock of the Willys-Overland Co., Toledo, Ohio, which was offered to stockholders a few weeks ago for subscription of a $44 share was entirely taken up by the old shareholders, so that there will be none of the stock offered to the general public. The shares were subscribed for in proportion of one to each lot of five shares of common held, the exchange being on a share-for-share basis in respect to holders of preferred stock.

UNIFORM HEADLIGHT REGULATION

Chicago, Sept. 30—The necessity of a uniform law for the regulation of headlights on motor cars is being recognized more and more, and the American Automobile Association is urging a bill to meet the need of a uniform law and uniform enforcement in all states and to thus remedy the most dangerous condition of night driving, the use of high-power lights.

Of the few states regulating headlights, no two have identical rules. Visitors from one state to another have as much annoyance from this difference in law as from the lack of recognition some states give license plates from neighboring states. Other states than these already providing for regulations are expected to pass headlight laws at their next legislative meetings, owing to the growing list of accidents from headlight glare. At the next meeting of the legislative board the association will consider the drafting of a law acceptable to the states as a uniform solution of the problem.

Massachusetts, Connecticut and New Jersey lead in the regulation of headlight glare. New Jersey permits no white light, the direct rays of which shall project higher than 4½ feet from the road; if higher than this, all dazzle or glare must be eliminated. Massachusetts puts the distance above the ground at 42 inches; drivers of low-hung runabouts are thus better protected than in New Jersey which permits a height of 54 inches.

TIRE PRICES REDUCED

Jeannette, Pa., Sept. 30—Increased business is given by the Pennsylvania Rubber Co. as the reason for its new schedule of prices, which went into effect Oct. 1. Its 34 by 4 tires in vacuum cup are $27.60, as against $30.30; in ebony tread, $24.85, as against $25.75; bar-circle casings, $21.15, against $22.50; in puregum tubes, $3.75, as against $4.25; in Paruco tubes, $4.75, as against $5.30. The reduced prices have been made possible by big additions in the production and buying ends

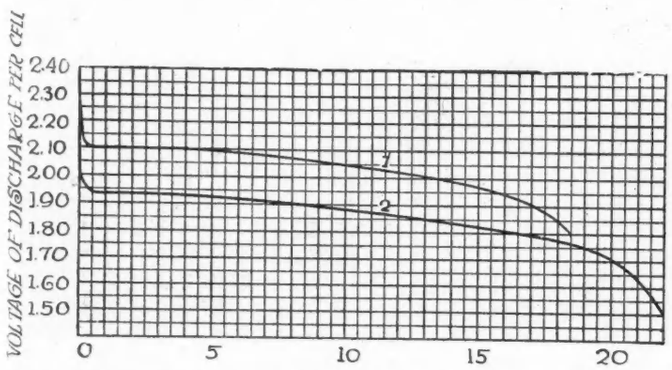


Fig. 7—No. 1 line represents the discharge at 5 amperes with the figures on the bottom of the chart representing hours. No. 2 line represents the discharge at 100 amperes with the bottom figures representing minutes. This gives an idea of the vast range in discharge rate

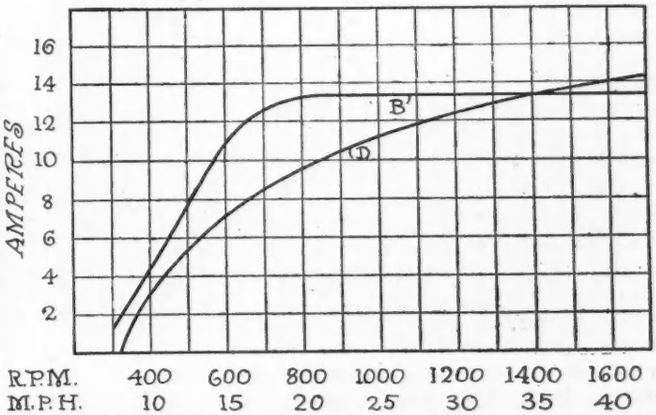


Fig. 8—B and D represent changing curves. B generator is correct. D generator does not charge properly

2,452,000 Miles of Road

11.3 Per Cent of American Streets Receive Surfacing

Expenditures for Street and Bridge Works Increase 250 Per Cent

WASHINGTON, D. C., Oct. 1—The total length of public roads in the United States outside the limits of incorporated towns and cities was about 2,452,000 miles on January 1, 1916. Of this, about 277,000 miles, or 11.3 per cent, were improved with some form of surfacing. The mileage of surfaced roads has been increasing at the rate of about 16,000 miles a year, and in 1915 approximately one-half of this increase was made under the supervision of state highway departments. In addition these departments supervised the maintenance of nearly 52,000 miles of main and trunk line roads.

The increase in expenditures for road and bridge work in the United States has been from approximately $80,000,000 per year in 1904 to about $282,000,000 in 1915, an increase of more than 250 per cent. The expenditure of state funds during this same period increased from about $2,550,000 to more than $53,000,000. In addition, more than $27,000,000 of local funds was spent under state supervision in 1915, bringing the total road and bridge expenditures managed by the states to $80,514,699. This amount is greater than the total expenditures for roads and bridges from all sources in 1904.

The growth in importance of the state highway departments has been rapid. The first of these agencies was created in 1891 in New Jersey and now some form of highway department exists in every state except Indiana, South Carolina, and Texas. Since their inception these departments had expended to January 1, 1916, an aggregate of $265,350,825 in state funds for road and bridge construction, maintenance, and administration. They had constructed over 50,000 miles of roads in coöperation with the states. More than 40,000 miles of these roads were surfaced.

The falling off in the value of road work performed by statute and convict labor was from $20,000,000 in 1904 when the total road expenditures were $80,000,000, to about $15,000,000 in 1915 when the total expenditures had grown to $282,000,000. This was a reduction from 25 per cent of the total in the former year to less than 5½ per cent of the total in 1915.

An increase in the use of better and more expensive types of roads also is shown by the recently compiled statistics. This development has been due, in large part, to the great increase in motor car traffic. It is estimated that there are now approximately 2,500,000 cars in use on the roads of the country, or 1 car for every mile of road. This present motor traffic is in excess of traffic of all sorts 12 years ago.

The cash road and bridge expenditures of the United States averaged only $28 per mile of rural roads in 1904. In 1915 this average had grown to $109 per mile. New Jersey led all other states both in 1904 and in 1915 with $221 and $475 per mile respectively. Nevada made the least expenditure in both years—$3.72 per mile in 1904 and $17 per mile in 1915.

INDIANA LICENSES NET $682,902

South Bend, Ind., Oct. 3—Indiana, for the first 6 months of 1916, received $731,498.96 in motor vehicle licenses. Of this total sum $48,596.54 was spent for administration, leaving $682,902.42 to be distributed to the counties of the state for road construction and maintenance. The license law provides that the net income from the sale of licenses shall be divided among the counties as follows: One-third of the total to be distributed equally among the counties; one-third to be distributed pro-rata according to the number of miles of improved road in each county; one-third of the total to be distributed pro rata to the total amount of license money received from each county.

SURVEY OF CONCRETE ROADS

Chicago, Ill., Sept. 30—The Portland Cement association is planning to undertake, some time between October 15 and November 15, a comprehensive survey of all concrete roads in the United States, the object being to determine their condition and to confer with local road authorities everywhere as to maintenance or any similar attention that such roads may need.

To Avert Car Shortage

N. A. C. C. Asks Dealers to Assist by Prompt Unloading

Would Keep Freight Cars for Motor Shipments in Continual Service

NEW YORK, Sept. 30—The National Automobile Chamber of Commerce has notified its members that car balances of the American Railway Association shows a net shortage of 14,281 freight cars. This is the lowest supply ever reported at this time of the year when there is usually quite a surplus of cars. A year ago this surplus was 264,243 cars, notwithstanding which a serious car shortage was experienced during the months immediately following.

Members are told this condition indicates that each freight car must be made to perform maximum service and it is urgently recommended that incoming freight at the factories be unloaded promptly and not be permitted to accumulate; also that shipments of motor cars to dealers should be unloaded immediately upon arrival, inasmuch as such shipments are in the special motor vehicle cars, which will be the first to feel the shortage of equipment.

If this is not done, the dealers will find that factories will be unable to ship their machines and the chamber urges close cooperation of dealers in this respect. The use of motor vehicle freight cars by dealers for storage purposes has been a serious handicap in previous seasons and it is pointed out that the dealer is not doing

WHEN WISCONSIN MET ILLINOIS

The denunciation tour by motorists along Sheridan road, the main thoroughfare between Chicago and Milwaukee, was consistent—on muddy roads on a rainy day. Governor E. D. Phillips of Wisconsin and Congressman G. E. Foss of Illinois are shown cutting the ribbon which marked the boundary of the two states and the meeting place of the delegates

his full duty merely by paying demurrage, as it is the empty car that is wanted by the trade.

The traffic department of the N. A. C. C. has advised members that this matter has been receiving attention with a view of adopting all possible measures to protect the supply of motor vehicle freight cars to move machines from the factories. The department will continue advising railroads throughout the country daily of shipments en route to them so that the cars may be closely supervised and returned promptly for further loads. It also will keep a close watch on the number of cars on each important railroad and take the necessary action to keep the cars moving if it is found that some roads regularly hold more than a normal number of these cars on their lines.

A committee of four traffic managers from the motor car companies and a committee of five railroad operating men have been appointed to coöperate with the chamber in proper supervision of freight cars.

OHIO MOTORISTS VIE FOR NUMBERS

Columbia, O., Oct. 4—The state registrar of motor vehicles is being overwhelmed with applications from car owners for special serial numbers for 1917 plates. Owners of cars in the Buckeye state show many idosynerasies in their applications. A large majority of drivers have some special hobby as to numbers on their licenses. The department always tries to issue the numbers desired if it is at all possible to do so.

In all there were almost fifty applications for No. 1. That number for the coming year has been promised to J. W. Scott, a lawyer of Troy, O. Applications for No. 2 are also quite numerous and, in fact, many requests are received for all of the small numbers up to 100. No. 13 will be given to Walter Baker, Cleveland, founder of the concern manufacturing the Baker Electric. Mr. Baker has carried around the hoodoo number on his car ever since the registration law was effective. Frequent applications are received for No. 23 also.

More than a thousand requests have been received from owners who desire the same number in 1917 that they had in 1916.

Mr. Walker frequently has number plates returned which start with or end with number 13. In practically all of these cases the number is taken back and new tags are issued. The hoodoo number is then given to some owners who has no scruples about the number.

Up to September 28 the Ohio department issued 236,535 licenses to owners of gasoline cars; 4,500 to owners of electrics and 2,940 to dealers and manufacturers. Thus the total number of cars in use in the Buckeye state up to that date was approximately 244,000. Transfers to the number of 5,240 have been issued by the department, but that number is not counted into the total.

U.S. May Standardize Gas

Federal Government Joins Hands with Business Men

Bureau of Standards to Establish Method to Stop Dilution

WASHINGTON, D. C., Oct. 3—The federal government, through Secretary of Commerce William C. Redfield, has joined hands with the Washington Chamber of Commerce, and other local business organizations, to bring about the prosecution of those who sell an inferior quality of gasoline in the District of Columbia, or do not give full measure for money received. Both of these evils exist in the national capitol to an extent, it is asserted, probably existing nowhere else.

The Department of Commerce, following a conference with officials of the Retail Merchants' Association, has put the machinery of the government in motion to make the campaign a reality. The bureau of standards has been instructed to establish a method by means of which dilution and other evils in the distribution of gasoline can be stopped.

With a formal definition of what constitutes a standard gasoline by the bureau of standards it is expected that the action of the Department of Commerce will pave the way for remedial legislation, if necessary, not only of a state and municipal character, but national as well.

The federal bureau of mines is also giving its aid in this matter. It is said the bureau of mines has had the subject under consideration for several months and shortly will issue a report that will be of interest to every user of gasoline in this country. At the request of the general supply committee the bureau has been engaged in drawing up standard specifications for the purchase of gasoline by the government, which uses about 50,000 gallons each year in Washington.

THINKS 12-CENT GASOLINE POSSIBLE

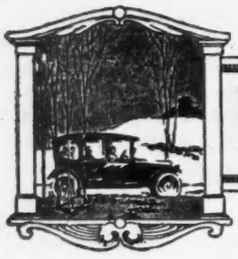
Savannah, Ga., Sept. 30—Only two things, neither of which are impossible, stand between the consumer and gasoline at 12 cents a gallon, according to a speaker at the recent meeting of the retail division of the South Florida Chamber of Commerce. These two things are: A law to require any manufacturer offering his products for sale to offer the materials from which the products are made at the market price and a law setting a minimum price of 12 cents.

The first is necessary, contends the speaker, J. Mack Towne, before obtaining crude oil, which could be obtained under such a law at 78 cents a barrel. With crude oil available at this price Mr. Towne says he then could make and sell gasoline at 12 cents with an expenditure of $100,000 for a plant. The second law would be necessary to prevent larger concerns from selling at 6 cents a gallon to break the smaller plant.

It is impossible to buy crude oil except for engines or boilers, says Mr. Towne, who has tested this statement by meeting the oil salesman with the proposition of the new gasoline plant when approached as a probable owner of oil burners. The remainder of the talk was on the loss of money through the use of poor quality gasoline.

SUFFRAGE PILGRIMS COMPLETE U. S. TOUR

Mrs. Alice Snitje Burke and Miss Nell Richardson have just finished a country-wide tour in behalf of suffrage. Upon their return to New York they were greeted by a parade of suffragists in motor cars. The mascot in Miss Richardson's lap was dubbed Saxon in honor of the car that carried the trio. The list of cities visited and the date are on the door



EDITORIAL PERSPECTIVES

Standardize Your Traffic Rules

THAT a subject of so great importance to city dwellers, whether they be pedestrians, businessmen or mere motorists, as the proper regulation of street traffic, should be in such an unstable state throughout the country speaks ill for America's vaunted business efficiency. To travel from one city to another, perhaps only a score of miles away, is to pass into a foreign country, so far as traffic rules are concerned.

FORTUNATELY for tourists, traffic officers in the larger cities usually pass unknowing infractions of local rules by motorists who are patently from out of town and with a reprimand or a word of caution for the outlander, usually are content. However, there are cities in which the unwitting criminal is made to realize that "ignorance of the law is no excuse."

THERE is no good reason why the main features of the traffic codes in all cities should not be the same. The only reason they are not the same is because city fathers and police departments codified existing rules which were made from time to time as the need arose, with little thought to their effect being anything but local.

IT IS time that a tourist should be able to travel from coast to coast and be sure that in the main, at least, the rules he learned in his home city obtain in any he may visit. Motor Age is working for such a code and the article on Standardizing Traffic Rules published in Motor Age issue of September 28 is the first step toward it. Your suggestions and criticisms will be another.

Preparing for Winter

WINTER motoring, if it is to be the pleasure that summer use of the car is, requires certain definite preparation. If one is to use the vehicle of his summer tours during the cold months, without annoying and expensive delays, one must make certain arrangements not necessary in warmer weather.

THE obvious things, such as anti-freezing solutions in the water system, radiator covers and so on are not the only ones. Just as important are the tuning up of the ignition and carburetion systems and the starting and lighting equipment. The electrical equipment of the car is called upon to do a great deal more work in winter than in summer. The lights are lit a much greater proportion of the time; the cold engine takes more power to start the pistons moving and break the stiffer film of oil; the fuel does not vaporize as readily and condenses more quickly; and, lastly, the battery itself is not nearly so efficient in cold weather—it takes more energy to charge it in proportion to the energy it gives out when it is cold than when it is warm.

CONSEQUENTLY, the wise plan is to start the winter season with a fully charged battery and see that it is kept to nearly full charge. A fully charged storage battery will not freeze—a discharged battery will freeze. The wise motorist will see that his generator is supplying sufficient current to keep the battery fully charged under his ordinary conditions of winter use.

THERE is one factor which will weigh much in the balance of battery life in the winter months. That is the proper arrangements for making the motor start easily and quickly. The general assumption that it takes twenty times as long to replace the energy used in starting a motor is nearly correct for most systems.

BUT the electrical and carburetion systems are not the only element of the car that need attention for winter work. Tire changing is anything but pleasant on snowy, sleety roads; tires should be looked to and put into first-class shape. Lighter oil may be needed in engine and transmission, etc.

Metamorphosis of the Caterpillar

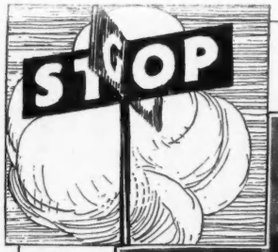
THAT man-made crawling thing, that began originally as a plebian tiller of American farms, the caterpillar tractor, if authentic reports from the European battlefronts are to be believed, has developed into one of the most efficient fighting units that has ever appeared in warfare. In romantic interest, this actuality, vague as it is to us, exceeds anything that H. G. Wells or Jules Verne ever imagined.

WHETHER the new arm of the British service is a product of American ingenuity or was developed in its entirety in England cannot be determined definitely. However, the burden of the evidence seems to be in favor of its Yankee origin.

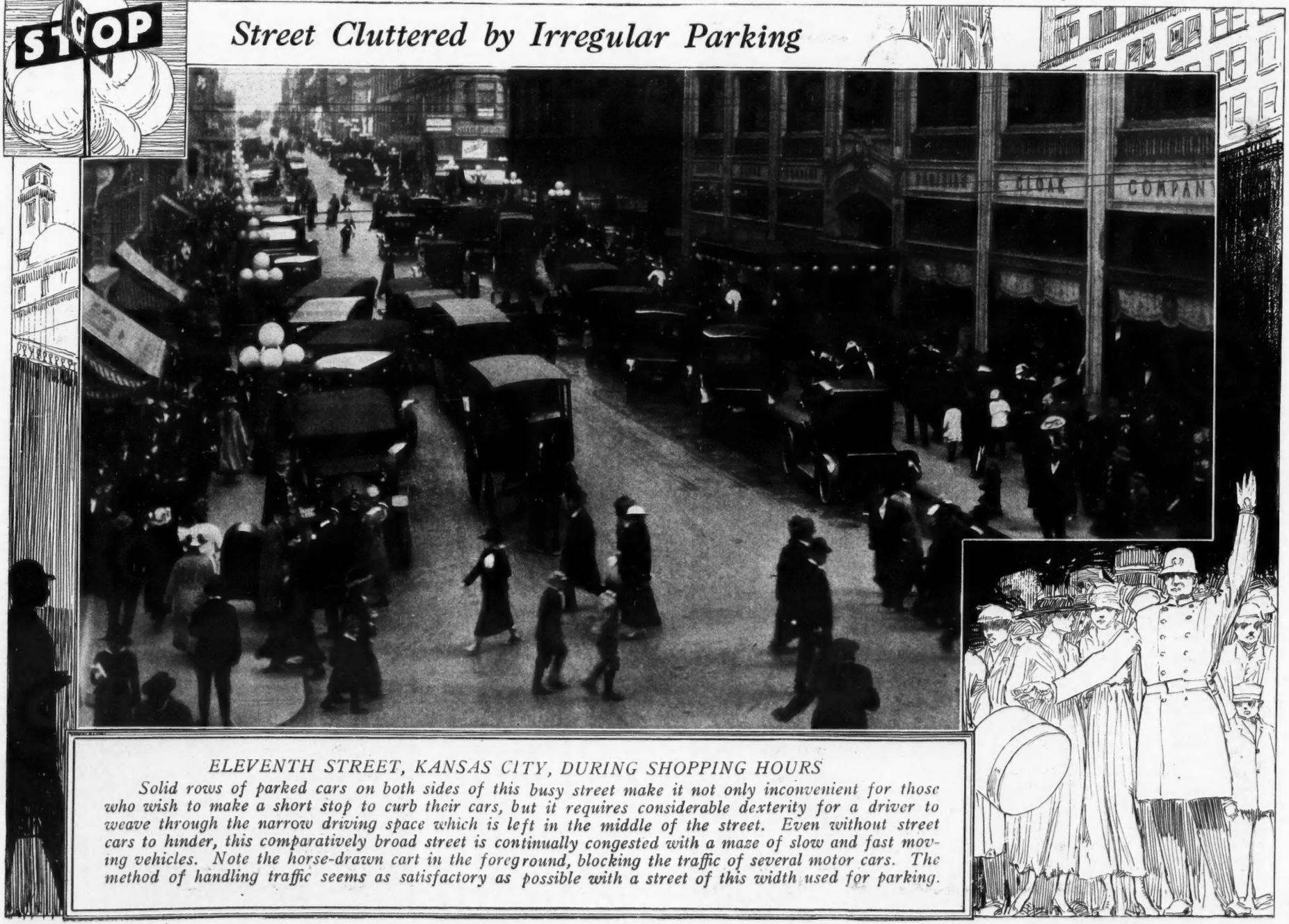
THE dinosaur could not have left more consternation and havoc in his passage than does the transfigured motor car that is helping fight the allies' battles on the Somme front. For, give it what name you will, whether land battleship, the tank offensive, tortoise, perambulating battery, or monster—all these names have been given to it—the idea remains the same: A motor car that avails where whole companies of soldiers fail has come into being, if reports are to be believed.

BOTH defensive and offensive in ability, this almost impregnable creation advances unharmed through gunfire and crosses trenches and tears down embankments. Consternation invariably fills its enemies when it appears; its friends are cheered. No one knows quite how to take the newcomer, which, in the short time since its first trial, September 15, has been gaining ground for the allies. But its record so far amply justifies both enemies and friends in their receptions of it.

LEANING against a brick wall, it rises on the crashing bricks and totters with deceiving feebleness into the midst of the ruins. Meanwhile, it throws out fire and lead, and then stumbles to good purpose over machine guns and gunners.



Street Cluttered by Irregular Parking

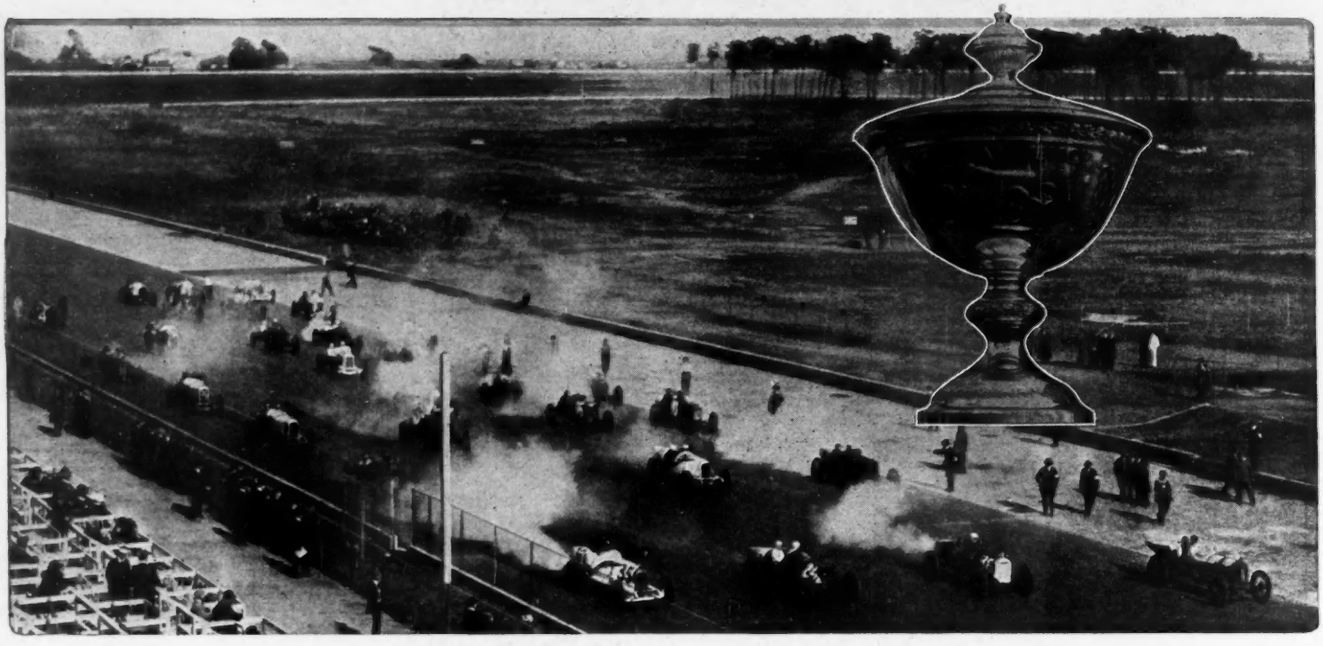


ELEVENTH STREET, KANSAS CITY, DURING SHOPPING HOURS

Solid rows of parked cars on both sides of this busy street make it not only inconvenient for those who wish to make a short stop to curb their cars, but it requires considerable dexterity for a driver to weave through the narrow driving space which is left in the middle of the street. Even without street cars to hinder, this comparatively broad street is continually congested with a maze of slow and fast moving vehicles. Note the horse-drawn cart in the foreground, blocking the traffic of several motor cars. The method of handling traffic seems as satisfactory as possible with a street of this width used for parking.

Aitken Breaks 250-Mile Record

Peugeot Driver Wins Astor Cup in Sheepshead Bay Event at 104.83 Miles Per Hour



Racers off for 250-mile Astor cup race at New York board track, and the trophy captured by Aitken

By D. M. LAY

SHEEPSHEAD Bay Motor Speedway, Sept. 30—Roaring rhythmically around 125 laps of the 2-mile board track without a single stop, Johnny Aitken's Peugeot smashed the world's record for the distance when he romped through the 250-mile Astor cup race in 2:20.04, at an average speed of 104.83 miles per hour. His time was 3:20.68 better than the previous record for 250 miles, which was 2:33:31.16, made by Resta, on the Chicago speedway.

HOW THEY FINISHED

Driver	Car	Time	Speed
Aitken,	Peugeot	2:23:04	104.83
Rick'r,	Maxwell	2:24:19	103.90
Vail,	Hudson	2:34:01	97.40
Lecain,	Delage	2:34:42	97.00
Pullen,	Mercer	2:37:26	95.20
Klein,	Crawford	2:38:01	94.80
Devigne,	Delage	2:38:31	94.60
Mulford,	Dus'bg	2:42:02	92.30
Hughes,	Hoskins	2:42:56	92.10
Milton,	Dus'bg	2:45:37	90.60

Johnnie Aitken after the finish of his third successive victory

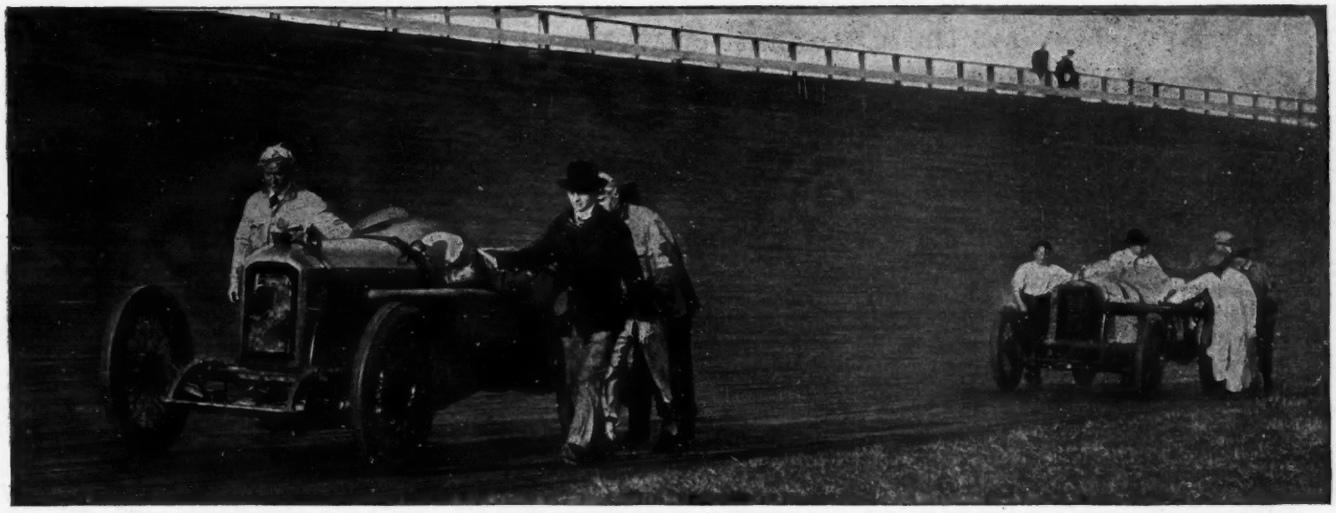
Aitken's victory was his third successive one in as many meets. His fortune started at Cincinnati in September. He then won the Indianapolis race. Today's was his third start.

Traveling at the rate of speed which won the race—and supposing, of course, that such a thing were possible over the roads—a car would cover the 3,476 miles from New York to San Francisco in 33 hours 12 minutes; the 1,050 miles from New York to Chicago in very close to 10 hours and the 1,020-mile stretch from Denver to Chicago in less than 9 hours and 44 minutes.

The 1,350-mile trip from Chicago to New Orleans could be made at this speed in a little over a half day; the time required being 12 hours and 53 minutes. To mention some shorter intercity runs: Denver to Salt Lake City, 600 miles, could be made in 5 hours and 43 minutes; Chicago to Minneapolis, 470 miles, would require only 4 hours and 29 minutes; the 450-mile run from Los Angeles to San Francisco could be covered in 4 hours and 17 minutes; the 320-mile gap between St. Louis and Kansas City could be bridged in a trifle of a minute or two over 3 hours and the famous run from New York to Boston would be a mere bagatelle, a matter of only 2 hours and 14 minutes.

Last Half a Walk-Away

It was all Aitken's race after Resta's Peugeot was eliminated by a broken intake valve just as he was completing the first century and Christiaens' Sunbeam



Vanquished—Two fallen heroes who succumbed to Aitken's speed. Resta and Christiaens push their mounts to the pits after a valiant battle

fell victim to a broken connecting rod on the next circuit.

So phenomenal was Aitken's speed that many of the 40,000 spectators doubted whether his car could endure the terrific pace he was forced to set by Rickenbacker and Henderson in the Maxwells, Vail in the Hudson and Mulford and Milton in the Duesenbergs, all of whom strove to uphold the prowess of America in the strife of speed. Aitken, however, was not to be denied, for he knew just how far to force his Peugeot without subjecting it to strains which might result in broken parts and eliminations. He sent his car around the track with the regularity of clockwork and its engine never seemed to miss a stroke. His tires served perfectly, as is evidenced by his record of 250 miles without a stop.

Three-Cornered Contest Ends

Keen disappointment was general when the three-cornered battle between Aitken, Resta and Christiaens was brought to an abrupt conclusion by the practically simultaneous elimination of the winner's two most formidable rivals. Interest did not wane, however, for the daring driving of the pilots on the American-built pursuers of the Peugeot furnished thrills in abundance. The spectators realized that a single stop by Aitken meant the loss of the lead and a terrific spurt would be necessary to regain it. They watched him feverishly as the race neared its close, many fearing signs of faltering would appear in his car as the gruelling grind wore on. Adherents of the Maxwells, the Hudson, the Duesenbergs and Mercers cheered frantically when their favorites seemed to be gaining on the fleeting foreign car. Even when the leaders had finished the race over half the crowd remained in the stand to watch the stragglers fight it out among themselves, so close was the interest in every detail of the outcome.

Ideal weather conditions prevailed, the day being almost identical with that on which the race was run last year. The crispness of autumn gave a tang of excitement and invigorating quality to the air. A snappy breeze drove light fleecy clouds across the blue sky and the bright sun furnished sufficient warmth to draw the sting from the atmosphere.

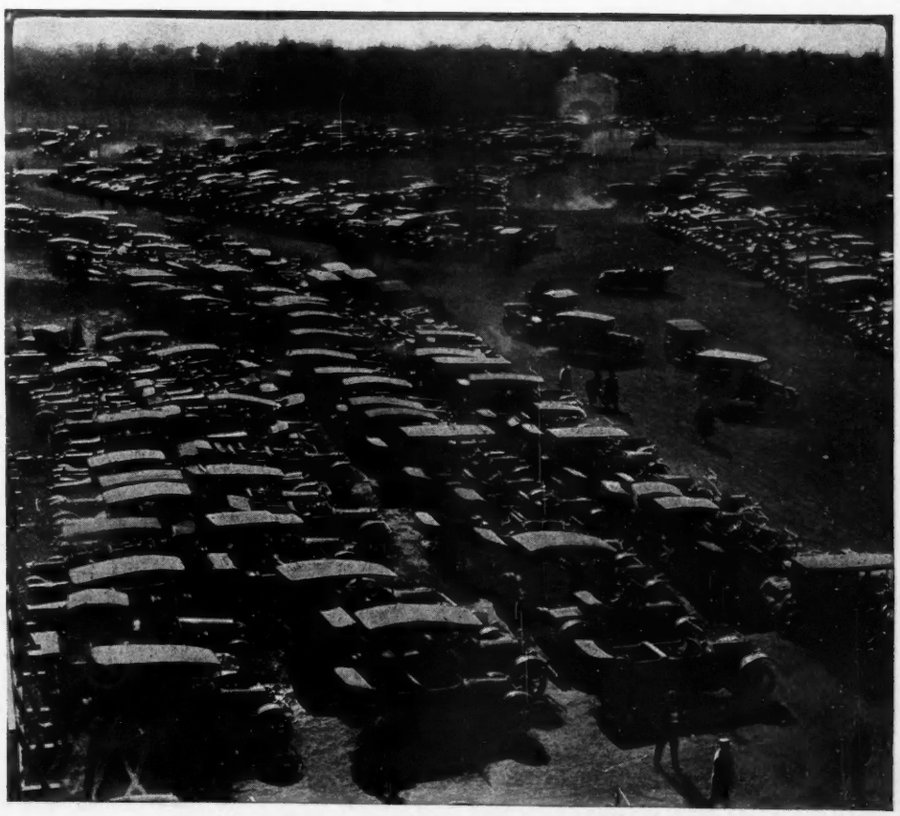
The stands were well filled when the thirty-one cars were lined up in rows of four for the start and streams of people were still crowding through the gates. Murmurs of disappointment were heard when it was announced that Ralph de Palma would not start, owing to a broken valve in his Peugeot which it had been found impossible to repair in time.

In seven rows of four cars and with three in the eighth row the racers were sent off on the preliminary lap, crossing the line for a flying start at 2:31 with Christiaens' Sunbeam in the lead. The English mount of the Belgian driver was still in the van at the end of the first lap, closely followed by Resta and Aitken in

250-MILE WORLD RECORDS

Track.	Surface.	Time.	Speed.
Sheepshead Bay..	Board	2:23:04.03	104.83
*Brooklands	Concrete	2:33:24.93	97.77
Chicago	Board	2:33:31.16	97.70
Indianapolis	Brick	2:47:06.54	89.75

*The record made on the Brooklands track in England is unofficial.



Not all the cars were on the track—a portion of the parking space

As the Cartoonist Saw the Astor Cup Race

UNANNOUNCED ITEMS ON THE DAY'S PROGRAM
1. AERONAUTICS: FRED WAGNER BAGS A FEW STRAY BALLOONS FROM THE ENEMY'S LINES
BANG
2. PATHETIC ONE-MILE PUSH-HOME RACE BETWEEN THE SUNBEAM TEAM AND THE PEUGEOT PUSHERS AFTER RESTA'S AND CHRISTIAEN'S ENGINES WENT ON STRIKE
COLD and WINDY
WEATHER REPORT FROM THE GRANDSTAND
"PENNANTS!"
SYDNEY OXBERRY

their blue Peugeots, with Louis Chevrolet's Sunbeam close behind. These cars made a group slightly in advance of the rest of the field and as the race progressed they drew into the lead by a wider and wider margin, their speed averaging about 106 miles per hour for the first few laps.

On the second lap Christiaens was still ahead. Resta had passed Aitken.

On the fourth lap Chevrolet's terrific speed enabled him to forge to the front with Resta second and Christiaens third.

For 10 miles Chevrolet and Aitken battled side by side in as pretty a duel of speed as was ever seen on the Sheepshead speedway.

The Sunbeam crossed the 20-mile mark a few seconds ahead of Aitken, but at 26 miles Chevrolet's car gave up the battle and went to the pits with a burned-out bearing which terminated the veteran driver's hopes of victory.

After Chevrolet was eliminated Aitken held the lead with Resta second, forcing him like a veritable Nemesis, and Christiaens, third, burning to avenge the withdrawal of his teammate. At 30 miles Resta swept into the lead and the spectators sent up a ringing cheer as he passed Aitken. The order was reversed 10 miles later when Aitken again swung into front position, Christiaens still hanging to third with bulldog tenacity.

Passing Resta, Christiaens came into second place and for the next ten laps there was a thrilling struggle for supremacy between the dark slender Peugeot of Aitken and the flashing nickled Sunbeam of the Belgian. In the thirtieth lap Aitken had only a small margin of lead which he increased slightly by the time the 70-mile mark was reached, the other cars maintaining the same positions.

Cars Lapped by Leaders

Back in the field most of the cars had been lapped by the three leaders before the fortieth lap was over and there were evidences that the tremendous pace was telling as car after car dropped out at the pits, until, when the 100-mile mark drew near, only twenty-two of the thirty-one starters were still circling the bowl.

One of the biggest thrills of the race came in the forty-ninth lap, 100 miles, when Resta's car was seen to falter and slow down as it sped out of the homestretch into the bank.

Occupants of the stands and the bleachers rose to their feet in one great wave, pointing toward the back stretch where the Peugeot had drawn up beside the inner railing. A babel of exclamations and excited inquiries broke out and swelled in volume as the red fire truck swayed across the rough ground of the infield followed by a stream of spectators in cars and on foot. It developed that a broken intake valve had put the quietus on Resta's hope that the bad fortune which has followed him on the Sheepshead speedway would not prevail this year. In stopping, a small blaze broke out which caused the alarm of fire, but driver and mechanic quickly smothered it.

As the news that Resta was out of the race spread through the stands, a new cause for excitement developed when it was seen that Christiaens' Sunbeam, then in second position and battling with Aitken for the lead, had slowed up and come to a stop almost beside Resta's car on the very next lap of the track. A broken connecting rod was responsible and after the other cars had made many laps the two unfortunates appeared around the bend leading to the homestretch pushed by drivers and mechanics in a mournful procession to the pits.

Aitken was now far in the lead, and the only cars that seemed likely to challenge him for that position were the two Maxwells, the Hudson and the Duesenberg,

which were having many fascinating speed brushes on the turns and straightaways as they fought for the privilege of passing the Peugeot. Lewis' and Galvin's Premiers and Wilcox's Peugeot had been forced to give up the race because of burned-out bearings. A broken connecting rod had disposed of Henning's Ogren and a leaking intake was responsible for the elimination of McBride's Olsen.

After the Sunbeam had been put out of the running, Rickenbacher and Henderson took second and third positions and alternated in this order for a good part of the balance of the race. Mulford's Duesenberg was leading Vail in the Hudson with Milton's Duesenberg trailing.

The only accident of the day occurred on the sixty-first lap when Ruckstell's Mercer blew a tire at the top of the bank on the turn running into the homestretch and tumbled to the bottom of the slope, rolling over and over, with driver and mechanician strapped in the seat. Ambulances, physicians, race officials and the fire truck hurried to the spot where a cloud of dust surrounded the wrecked racers. A cheer of relief went up from the spectators, all of whom had risen to their feet as the yellow car hurtled across the track, when they saw Ruckstell and his mechanic, Quicksell, crawl from beneath the overturned machine and rise to their feet. The only injuries sustained, it developed, were a few bruises by Ruckstell and a sprained shoulder by his mechanic.

During this time, Aitken had been increasing his lead, being nearly 2 minutes ahead of the record for the distance at the 150-mile mark. Henderson's Maxwell was in second position at this stage of the race with Rickenbacher close behind and followed by Mulford, Klein in the Crawford, Vail in the Hudson and Milton's Duesenberg. This order continued lap after lap. At the end of the eighty-fifth lap Aitken had averaged 104.1 miles per hour, Henderson's Maxwell was still second, but Milton's Duesenberg had taken the third position from Rickenbacher. It was now 4:15 and a number of the spectators, evidently considering the race won by Aitken, began to leave the stand. The great majority, however, continued to watch the speeding cars with intense interest.

Speed Goes to 105.75 M. P. H.

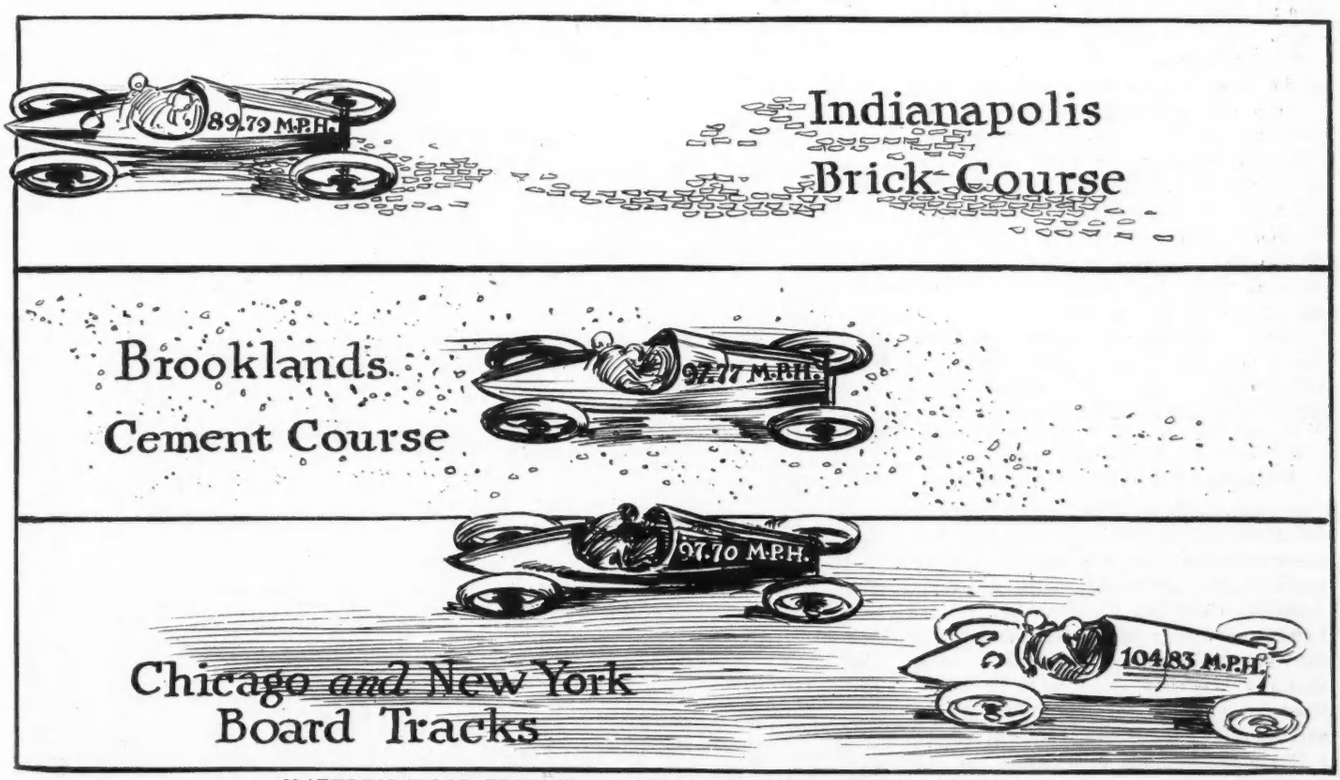
At 200 miles Aitken had lifted his average speed to 105.75 miles per hour. Henderson was still second, having covered 196 miles and Rickenbacher and Mulford were in the same lap. Milton was in fifth position at this point with Vail, sixth; LeCain, seventh and Pullen, eighth. Aitken's time was 1:55:25.55 for the 200 miles or nearly 3 minutes ahead of the record made in last year's Astor cup race when the distance was negotiated in 1:56:21.40.

Henderson's Maxwell went out just after the 210th mile because of engine trouble, leaving Rickenbacher to overtake Aitken. This he tried in vain to do as the Peugeot driver was safely ensconced in first position and his car was running as smoothly as at the start of the race.

Vail in the Hudson did some sensational driving, during the 6 miles following the passing of the 150-mile mark, which probably enabled him to finish in third position. He had been close behind the leaders, but apparently had not tried to maintain the high speed which had characterized them. At this point, however, he deliberately set out to win a place among the cars in the van. His Hudson shot forward as though suddenly unleashed and rapidly overhauled the cars between him and the leaders, passing first Klein in the Crawford and then Mulford in the Duesenberg.

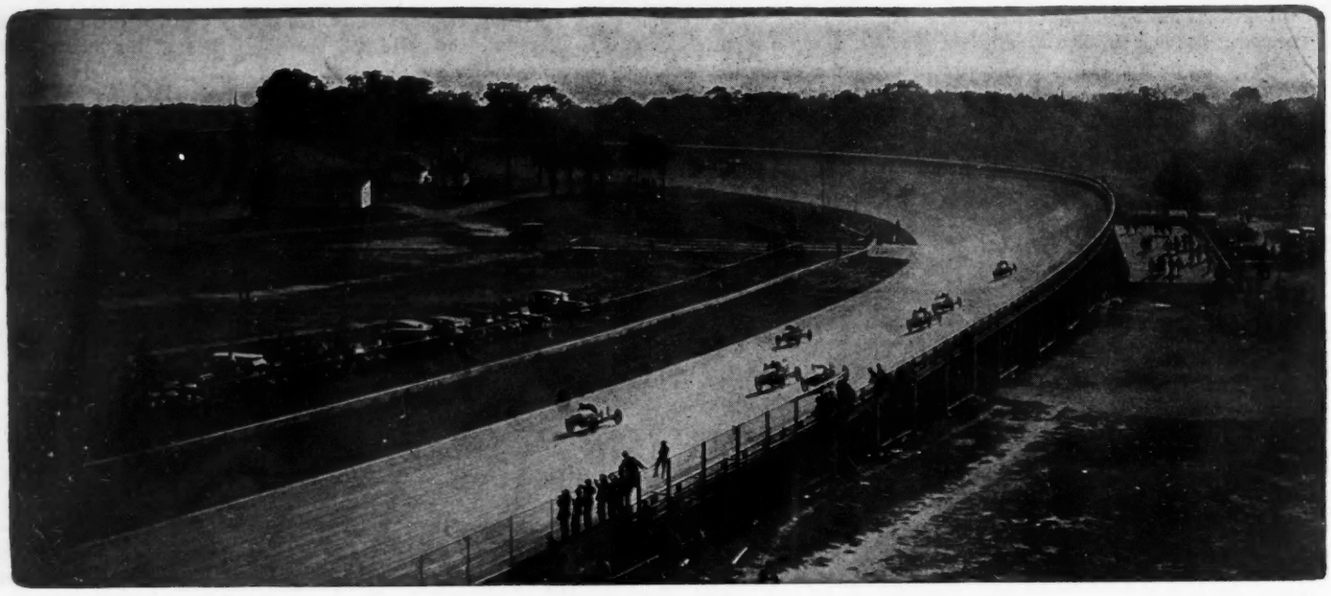
After a bitter battle he succeeded in passing Rickenbacher, his spurt placing him in third position with only Aitken and Henderson ahead of him. By the time the 200-mile mark had been reached, however, Rickenbacher again shot ahead of Vail and settled into second place when Henderson went out at the 210th mile, with Vail third.

Ralph Mulford also gave an exhibition of daring driving during the last 20 miles of the race, striving desperately to finish among the first three. At 230 miles he was sixth, trailing far behind Aitken, Rickenbacher, Vail, Milton and Klein, but during the next 10 miles he closed a wide gap by passing three cars, a feat for which he was cheered to the echo by the appreciative race fans in the stands. At 240 miles Mulford had worked his way into third place, but his lead on Vail was not wide enough to enable him to keep it, for, as the finish approached, Vail gradually overhauled him and finally shot past him with a burst of speed that carried him into third position for the race, Rickenbacher's Maxwell being second. Lecain finished fourth with Pullen and Klein fol-



NATURE'S WOOD TRIUMPHS OVER MAN-MADE CEMENT AND BRICK

250-Mile Records—*New York* 2:23:04.03, 104.83 *m. p. h.; Brooklands, unofficial,* 2:33:24.93, 97.77 *m. p. h.; Chicago* 2:33:31.16, 97.77 *m. p. h.; Indianapolis* 2:47:06.54, 89.79 *m. p. h.*



Taking the bank on the first turn from the grandstand

lowing in the order named. Others running at the finish of the race were Mulford, Hughes, Meyer, Milton, Devigne, Burt, D'Alene and Adams.

Some difficulty was experienced with the scoreboard early in the race owing to the failure of the electrical apparatus but the board was put in partial operation later in the race so that the positions of the leading cars were available. As the race neared its close, spectators broke away from the restraining guards and ran across the track in the path of the speeding cars, seemingly reckless of the awful danger of this needless disregard of the rules of the track.

A temporary diversion, which, however, might have been the cause of an accident, occurred during the first 100 miles when a number of toy balloons were seen bouncing and floating along the track in front of the grandstand, threatening to fly into the faces of the speeding drivers. Starter Wagner darted onto the track during intervals between passing of the cars and captured the roving spheres, greatly to the amusement of the spectators.

Fire protection was ample, the Johns-Manville company maintaining stations in the pits and several of the drivers carrying J-M extinguishers.

CHICAGO EXPECTS FULL ENTRY

Chicago, Oct. 4—Now that the differences between the Chicago and Indianapolis speedways have been settled with reference to Sunday racing, at the Speedway Association meeting in New York, by the Chicago speedway fixing on the October 14 date for its next meet it seems probable that the Maywood track will see competition of all the stars, including Aitken and the rest of the Indianapolis contingent.

If the Indianapolis crew enters, the Chicago field should be as complete as that last Saturday at New York.

Short Distance Increases Pace

EVERY 50 miles taken off the length of the speedway races means an added amount on the pace. The two factors are speed and distance. Each car can only go a certain distance at a given speed, and the 250-mile distance sent the leaders up to a pace of 105 miles per hour. This corresponds to the strategy of running a competitor off his feet in a foot race, and naturally soon drove the cars that had weak links in their chain of strength, to the pits.

There were forty-five stops made at the pits. Of this number nine were permanent. There were other cars which went out that did not reach the pits. Most notable of these were Resta and Christiaens, who went out on the back-stretch almost simultaneously when running about even and well up in the lead.

Of the cars that went out, broken connecting rods took the lead as a cause of trouble. Eight of the cars which went out at the pits suffered from this cause.

Owing to the cool weather and the shorter distance tire troubles were comparatively few. Pullen's Mercer car had more trouble in this regard than all the

Specifications and Equipment of the Cars

NO.	CAR	DRIVER	MECHANIC	NO. CYL.	BORE AND STROKE	DIS.	CARBURETER	IGNITION	MAKE OF PLUGS
21	Dans L'Argent	Muller	Conway	6	3.50 x 5.00	288.6	Hudson	Delco	Rajah
12	Maxwell	Rickenbacher	Longecamp	4	3.75 x 6.75	298.2	Miller	Bosch	K-L-G
14	Maxwell	Henderson	Kriplen	4	3.75 x 6.75	298.2	Miller	Bosch	K-L-G
19	Sunbeam	Chevrolet	Sarles	6	3.28 x 6.14	294.2	Claudel	Bosch	K-L-G
1	Sunbeam	Christiaens	Bill	6	3.28 x 6.14	294.2	Miller	Bosch	K-L-G
26	Duesenberg	Devlin	Ewan	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
10	Peugeot	Aitken	Becker	4	3.65 x 6.65	274.0	Zenith	Bosch	K-L-G
24	Duesenberg	Buzane	Sulages	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
29	Erbes	Cable	McGrath	4	3.63 x 7.19	289.3	Miller	Bosch	K-L-G
9	Crawford	D'Alene	Alexander	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
8	Crawford	Klein	Newgard	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
32	Crawford	Moore	Hetlich	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
11	Mercer	Ruckstall	Quicksall	4	3.87 x 6.37	300.7	Zenith	Bosch	Rajah
4	Mercer	Pullen	Thomas	4	3.87 x 6.37	300.7	Zenith	Bosch	Rajah
16	Delage	Le Cain	Woods	4	3.63 x 6.75	286.0	Miller	Bosch	K-L-G
18	Delage	Devine	Zwick	4	3.63 x 6.75	286.0	Miller	Bosch	K-L-G
2	Peugeot	Resta	Dahnke	4	3.66 x 6.65	275.0	Miller	Bosch	K-L-G
36	Pugh	Meyer	Marr	4	3.75 x 6.75	298.2	Master	Bosch	Rajah
28	Hoskins	Hughes	Murphy	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
33	Ogren	Henning	Smith	4	3.63 x 7	292.0	Miller	Bosch	Rajah
37	Ogren	Burt	Mason	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
25	Premier	Lewis	McAllister	4	3.65 x 6.63	274.5	Miller	Bosch	K-L-G
15	Premier	Galvin	Weigel	4	3.65 x 6.63	274.5	Miller	Bosch	K-L-G
5	Hudson	Vail	Luderman	4	3.50 x 5.00	288.6	Hudson	Delco	Rajah
34	Olsen	McBride	.....	4	4.341x 5.00	298.0	H. & N.	Bosch	Rajah
35	Olsen	Watson	Claus	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
27	Adams	Adams	Wockley	4	3.75 x 6.75	298.2	Master	Bosch	A. C.
3	Duesenberg	Milton	.....	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
6	Duesenberg	Mulford	Hitke	4	3.75 x 6.75	298.2	Miller	Bosch	Rajah
22	Peugeot	Wilcox	.....	4	3.65 x 6.65	274.0	Zenith	Bosch	K-L-G
	Duluth special	Rawlings	La Bounty	4	3.75 x 6.75	298.2	Miller	Bosch	A. C.

All cars reporting such equipment had Hartford shock absorbers and Boyce Moto-Meters. Three cars

Elapsed Time and Average Speed of Each Car to Finish Astor Cup Race

PLACE	CAR	NO.	DRIVER	TIME AT THE END OF 50 MILES	100 MILES	150 MILES	200 MILES	250 MILES	AVERAGE SPEED AT 50 M	100 M	150 M	200 M	250 M
1	Peugeot	10	Aitken	0 :28 :31.15	0 :57 :15.00	1 :26 :58.00	1 :55 :23.00	2 :23 :04.03	105.15	104.7	103.5	104.0	104.83
2	Maxwell	12	Rickenbacher	0 :29 :15.00	0 :58 :19.00	1 :27 :49.00	1 :56 :19.00	2 :24 :19.54	102.6	102.9	102.4	103.2	103.90
3	Hudson	5	Vail	0 :29 :44.00	0 :59 :11.00	1 :30 :34.00	2 :01 :54.00	2 :34 :01.00	100.8	101.4	99.5	98.4	97.4
4	Delage	16	Lecain	0 :30 :34.00	1 :00 :34.00	1 :30 :53.00	1 :59 :52.00	2 :34 :42.21	98.2	99.1	99.2	100.1	97.0
5	Mercer	4	Pullen	0 :35 :51.00	1 :04 :25.00	1 :36 :48.00	2 :05 :43.00	2 :37 :26.00	83.7	93.2	92.9	95.5	95.2
6	Crawford	8	Klein	0 :31 :00.00	1 :01 :51.00	1 :33 :10.00	2 :04 :47.00	2 :38 :01.00	96.8	97.0	96.6	96.2	94.8
7	Delage	18	Devigne	0 :32 :19.00	1 :03 :53.00	1 :35 :34.00	2 :05 :40.00	2 :38 :31.00	92.9	93.9	94.2	95.5	94.6
8	Duesenberg	6	Mulford	0 :32 :13.00	1 :01 :33.00	1 :37 :43.00	2 :09 :54.00	2 :42 :02.38	93.1	97.4	90.6	92.4	92.3
9	Hoskins Special	28	Hughes	0 :30 :04.00	1 :06 :41.00	1 :39 :59.00	2 :10 :22.00	2 :42 :56.15	99.8	90.0	90.0	92.0	92.1
10	Duesenberg	3	Milton	0 :32 :40.00	1 :04 :58.00	1 :38 :46.00	2 :11 :48.00	2 :45 :36.90	91.8	92.4	91.2	91.1	90.6
11	Pugh Special	36	Meyer	.....	.....	.....	.....	2 :47 :11.65	.....	.....	.....	.....	89.9
12	Adams Special	27	Adams	.....	.....	.....	.....	2 :55 :06.07	.....	.....	.....	.....	85.8
13	Crawford	9	D'Alene	.....	.....	.....	.....	3 :04 :01.90	.....	.....	.....	.....	81.7
14	Ogren	37	Burt	.....	.....	.....	.....	3 :06 :20.52	.....	.....	.....	.....	80.5

other thirty-one starters. He changed five tires while no one else changed more than one; in fact there were only three other tire changes, Vail in the Hudson car, Klein in the Crawford, and Gable of the Erbes team. None of the tires were blown or thrown in this race and there was a notable improvement in the manner in which the treads clung to the tire body as there was not one case of separation, whereas, the principal cause of tire failure in the races of last year was the tearing off of the tread.

The regulation of the oil supply continues to be the stumbling block for many of the drivers. This means spark plug trouble, if it is not correct, and the magnitude of the trouble is shown by the fact that there were more stops for plugs than for any other reason. Eleven times drivers drew up to the pits either to change or clean them. Adams, in the car bearing his own name, was the leader of the spark plug changers, as he had three stops on this account.

Carbureter adjustments were made on Mulford's Duesenberg, Chandler's Crawford, and the Ogren. None of these consumed much time and none was due to any defect in the carbureters.

Probably the most interesting of any of the pit stops was that made by Henning in the Ogren. On bringing up to the pits with engine trouble a search was immediately made for the cause, and inspection showed all the mechanism to be as it should. On cranking the engine, there was no suction through the carbureter and finally a blowhole was located in the intake manifold. This was sealed with shellac and tape, but the temporary repair could not stand the vibration and heat and consequently the car had to be withdrawn.

Aitken seemed to have no bearing trouble, one of the most frequent causes for failure at speedway meets. His engine bearings were Victor motor bearings, an Indianapolis product.

In general it may be stated that the pit work was well carried out. The limited amount of tire changing did not permit of much comment on the training.

Sheepshead Bay Mismanagement

A Criticism

ONE more example of discouragingly bad speedway management has been recorded. Saturday's race on the Sheepshead Bay speedway, New York, was as deplorable an example as has ever been witnessed at a great speedway race. There was scarcely any time during the entire race when spectators were not on the board track instead of being back of the fences. The situation was so bad that some of the drivers complained to the officials. If there were enough police to guard the course properly they were not properly instructed as to their duties and if they were properly instructed then the police and the general system were at fault.

As soon as Aitken finished, several thousand people crowded onto the board course. They jumped over the fences back of the pits and they jumped over the fences in front of the grandstand. The space in front of the pits was black with spectators, there were so many there that cars could not possibly have stopped there to make tire changes. The racing cars then on the course were dodging around much as they did at the finish of some Vanderbilt cup races on Long Island 6 years ago.

It is deplorable that the finest motor speedway in the world, and located adjacent to the world's greatest city, should have such a management fiasco as took place Saturday. It was a strong reminder of Vanderbilt cup days when in that famous road race the crowds nearly filled the roads and only spread apart to make room for cars as they came racing along. It was such affairs that killed the Vanderbilt cup race and killed road racing on Long Island. A few repetitions of Saturday's management and New York police department or other departments will have to take the matter in hand. With such management as the Astor cup race had, one accident will bring the speedway into bad repute.

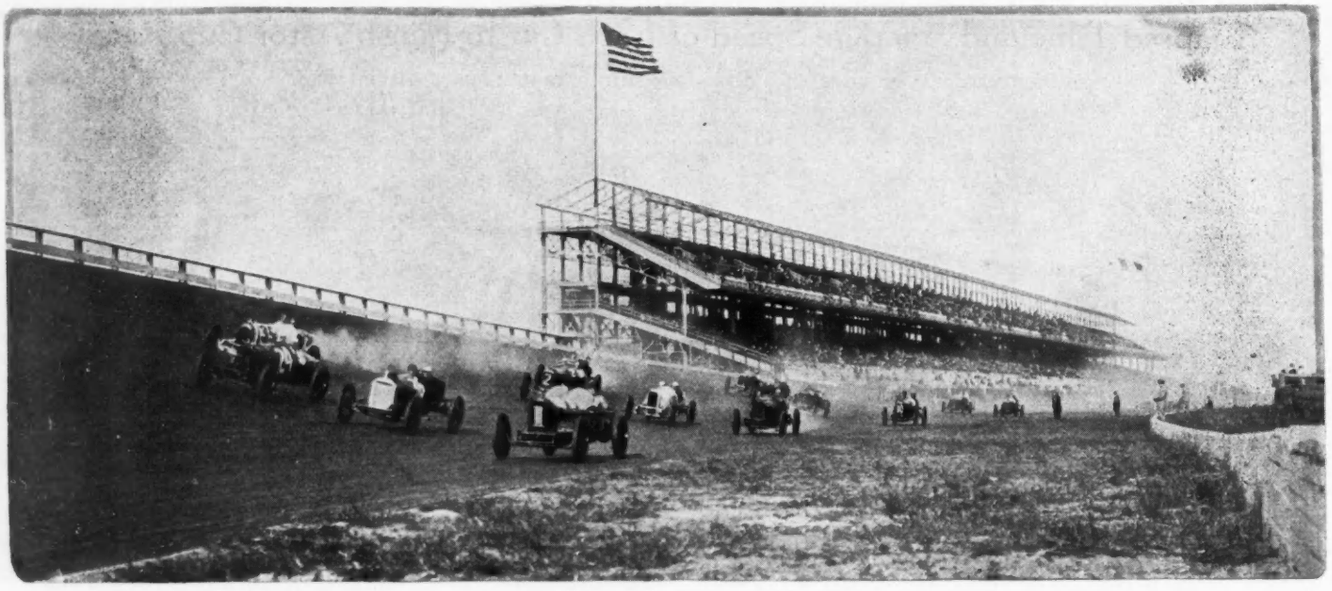
Foolish Curiosity

It is impossible to understand what morbid curiosity it is on the part of spectators that prompts them to leave their grandstand seats to rush onto the track when a leader has finished. The same applies to those on the infield. The affair of Saturday was similar to those last May when Limberg's accident happened.

Which Competed in Sheepshead Bay Race

NO. OF PLUGS	MAKE OF PLUGS	VALVES NO.	VALVES LOCATION	VALVES OPERATION	PISTON	OIL	TIRES	WHEELBASE	WHEELS
6	Rajah	12	Side	Shaft in crankcase	Cast iron	Oilzum	Silvertown	103	R-W
4	K-L-G	16	Head	2 O. H. shafts	Aluminum	Oilzum	Silvertown	106	Houk
4	K-L-G	16	Head	2 O. H. shafts	Aluminum	Oilzum	Silvertown	106	Houk
6	K-L-G	24	Head	2 O. H. shafts	Lynite	Castor	Silvertown	113	R-W
6	K-L-G	24	Head	2 O. H. shafts	Lynite	Castor	Silvertown	113	R-W
8	Rajah	16	Hor. in head	Vertical rockers	Aluminum	Mobiloil	Silvertown	106	R-W
4	K-L-G	16	Head	2 O. H. shafts	Leavitt	Oilzum	Goodyear	105	R-W
8	Rajah	8	Hor. in head	Vertical rockers	Aluminum	Oilzum	Silvertown	104	R-W
4	K-L-G	16	Head	2 O. H. shafts	Alloynum	Castor	Silvertown	98	R-W
8	Rajah	16	Hor. in head	Vertical rockers	Aluminum	Oilzum	Silvertown	106	R-W
8	Rajah	16	Hor. in head	Vertical rockers	Aluminum	Oilzum	Silvertown	106	R-W
8	Rajah	16	Hor. in head	Vertical rockers	Aluminum	Oilzum	Silvertown	106	R-W
8	Rajah	16	Head	1 O. H. shafts	Aluminum	Oilzum	Silvertown	108	R-W
8	K-L-G	16	Head	1 O. H. shafts	Aluminum	Oilzum	Silvertown	108	R-W
4	K-L-G	16	Head	2 O. H. shafts	Alloynum	Oilzum	Silvertown	106	R-W
4	K-L-G	16	Head	2 O. H. shafts	Alloynum	Oilzum	Silvertown	106	R-W
4	K-L-G	16	Head	2 O. H. shafts	Alloynum	Oilzum	Silvertown	100	R-W
8	Rajah	8	Hor. in head	Vertical rockers	Aluminum	Oilzum	Silvertown	108	Houk
8	Rajah	16	Hor. in head	Vertical rockers	Aluminum	Mobiloil	Silvertown	105	R-W
8	Rajah	16	Head	1 O. H. shafts	Alloynum	Castor	Silvertown	106	Houk
8	Rajah	8	Hor. in head	Vertical rockers	Aluminum	Castor	Silvertown	105	Houk
4	K-L-G	16	Head	2 O. H. shafts	Aluminum	Oilzum	Goodyear	105	R-W
4	K-L-G	16	Head	2 O. H. shafts	Aluminum	Oilzum	Goodyear	105	R-W
6	Rajah	12	Side	L head	Aluminum	Veedol	Silvertown	105	R-W
4	Rajah	16	Head	2 O. H. shafts	Aluminum	Castor	Silvertown	105	R-W
4	Rajah	16	Head	2 O. H. shafts	Aluminum	Castor	Goodyear	105	R-W
4	A. C.	16	Head	2 O. H. shafts	Aluminum	Oilzum	Silvertown	105	R-W
4	Rajah	16	Head	2 O. H. shafts	Aluminum	Oilzum	Silvertown	105	R-W
4	Rajah	16	Head	2 O. H. shafts	Aluminum	Oilzum	Silvertown	105	R-W
4	K-L-G	16	Head	2 O. H. shafts	Aluminum	Oilzum	Goodyear	105	R-W
8	A. C.	16	Head	2 O. H. shafts	Aluminum	Mobiloil	Silvertown	706	R-W

Three cars were not reported on these features.



The getaway after the flying start at New York

On that occasion the spectators not only got on the track at the scene of the accident, but actually got onto the middle of the track and started climbing up the banking of the track. They were fortunately chased off very quickly then. The wave, so to speak, did not break.

Sheepshead Bay speedway will have to mend its ways, and mend them speedily, otherwise providence will not be so kind to them as it was yesterday. The unexpected exigency will arise and the evil of a bad accident will remain with the track.

There is no reason for poor management in a speedway race. Indianapolis, the father of speedways, has demonstrated from its first race what management is. The track is properly guarded from start to finish and with crowds four to five times as great as Sheepshead Bay had yesterday has always been able to keep the crowds in place and keep the track clear, no matter what accidents happened. These are no secrets with the Indianapolis system. It is just simple business. Tracks are not guarded or protected by magic. You must lay your plans in advance. Every detail must be worked out in advance. You have to spend a little money to do it. It is as essential to have good management as it is to have good cars or a good crowd. Proper policing of the track is imperative.

Clear Track an Asset

In horse racing, keeping the track clear is one of the great assets of the sport. Very few officials are seen on the track, Only those actually needed. Others are fined a certain sum if they get on the course when it is not their place. It should be so in motor racing, particularly with average speeds of 105 miles per hour. Getting on a track on race day is a wrong conception of importance. The spectator who has no business on the track, but is determined to get on does so generally through egotism. He has a false conception that in the eyes of the other spectators he looks important, or has a position of superiority. To the spectator the position is diametrically opposite. The spectator generally looks with ridicule on the smart-Aleck who gets on the track when he has no business there.

There is no legitimate reason why elimination trials have still to be run on the morning of the race instead of two or three days earlier as per schedule, as was the case (again) at the Astor cup race. This violation of rules occurs at nearly every speedway meet, and will continue to occur so long as officials continue to condone it. There is a time set for elimination trials and they should be handled at that time. The drivers are all in favor of such, and would be ready were it not for the fact that they know there is a chance to get an elimination any time up to a few hours before the start of the race. The A. A. A. contest board is laying itself open to general criticisms for permitting such breaches of rules. Rules are to govern events and not to be needlessly broken.

Speedway Assn. Finally Organized

Dates Set for Championship Events

NEW YORK CITY, Oct. 3—Special telegram—Steps towards a permanent organization of the different speedways were taken here today when representatives of Indianapolis, New York, Chicago and Cincinnati speedways discussed tentative plans for the scope of such an organization. Today's meeting adjourned to meet in Chicago, Saturday, October 14, when a charter for such an organization will be adopted and immediately carried out.

The committee in charge consists of L. E. Myers, Indianapolis; David F. Reid, Chicago; E. Thompson, New York, and H. L. Ehmann, Cincinnati. These four are taking the old Indianapolis charter for such an organization and rearranging it to meet present conditions. R. Kennerdell, chairman of the contest board, A. A. A., will meet with the committee in Chicago.

Practically all the speedways were represented at a joint meeting of the contest board at the American Automobile Association in this city yesterday, when changes in the racing rules for 1917 were discussed and other necessary changes for 1917 racing recommended.

All speedways were agreed that the contest board should not sanction Sunday racing on speedways. Indianapolis, represented by J. N. Allison, was particularly strong on this ruling, due to the postponed race on the Chicago speedway being held on a Sunday, which caused the withdrawal of the Indianapolis team. David F. Reid, representing the Chicago Speedway, voted for the new rule.

It was decided that eight 1917 championship events be held, one on each speedway. These championships are to be at a minimum of 100 miles but may be at 250, 300, 350 or 500, according to the different speedways. It was voted to have a minimum cash prize at the rate of $100 per mile of race. This would make the prize for a 500-mile race $50,000; for a 250-mile race $250,000, and for a 300-mile race $30,000.

The eight championship events scheduled for 1917 are:

May 30	Indianapolis
June 9	Chicago
July 4	Omaha
July 14	Des Moines
July 28	Tacoma
Sept. 3	Cincinnati
Sept. 15	Providence
Sept. 29	New York

In addition to this schedule of championship events, which are only to be held on speedways, 1917 dates for other speedway races were arranged for as follows:

May 19	New York—Metropolitan
June 23	Cincinnati
Aug. 4	Kansas City
Oct. 6	Kansas City
Oct. 13	Chicago
Oct. 27	New York

It is expected that early next year two other speedways will be completed, namely, Philadelphia and Uniontown. Dates will have to be awarded for these as necessary.

The feeling was general that all drivers who qualify and start in 1917 races should receive some financial assistance, and it was decided to allow $100 transportation expenses to all cars qualifying and starting. Should a car finish in the money this amount would be deducted from the cash winnings of the car. If the car does not finish in the money the $100 will be awarded. In case of particularly long transportation trips, such as Chicago to Tacoma, a total allowance of $150 per car may be made.

No 1917 championships will be held outside of the speedways mentioned. This year the Grand Prize and Venderbilt Cup races will be included in the championship events. It was decided to allow the first 300-cubic inch cars finishing in these 1916 road events to receive championship points the same as if they won the event. In other words the first 300-cubic inch car to finish will receive 800 points, the second 420, and the third 220, etc.

Drivers Protected

Drivers will be better protected in 1917 so far as receiving prize money is concerned, than they were this year. At Minneapolis and Sioux City drivers were required to compromise and did not get their full cash allowance. For 1917 cash prizes must be posted 2 weeks before the day of the race.

While the drivers have been given every assistance under the new schedule there are a few rules which they will have to live up to. One of these is that every driver must be at the starting line one hour before the start of the race. Violation will mean a cash penalty.

Pit supplies for racing cars must be in the pits at least 3 hours before the start of the race.

Eddie Rickenbacker recommends that on speedways like New York and Chicago forty cars be permitted to start instead of thirty-two. It was expected the contest board will revise its rules acordingly.

The drivers winning positions in the 1916 championships will receive permanent racing numbers for their cars in 1917 according to the position they finished in the 1916 championships. Thus, the driver finishing first in the 1916 championship will have No. 1 for his car during the entire racing season. He will also be given No. 1 driver's registration. Driver finishing second will be given No. 2 for his car and also No. 2 driver's registration. This rule was strongly urged by the drivers as it will add to the championship interest of 1917 and will eliminate the necessity of having to paint fresh numbers on the cars for each race as was the case this year.

In order to swell the championship fund for 1917 the different speedways have agreed to pay to the contest board of the A. A. A. $10 for each car entered in a championship event. This money will all go to the 1917 championship fund.

Among those speedways represented at the meeting were Indianapolis, J. M. Allison and L. E. Myers; New York, Harry Harkness and E. Thompson; Chicago, David F. Reid, and E. Heinze; Cincinnati, H. S. Leyman; Uniontown, C. W. Johnson; Des Moines, L. C. Dunn; Omaha, J. W. McShane.

HARKNESS TROPHY RACE OCT. 28

New York, Sept. 30—The 100-mile race for the Harkness trophy will be held at the Sheepshead Bay speedway October 28. It will be for the Harkness trophy and $10,000 prize money. The first Harkness trophy race last year was won by Dario Resta in his Peugeot in 56:55.71 or 105.39 miles per hour.

UNIONTOWN TRACK IN NOVEMBER

Uniontown, Pa., Oct. 3—The new 1½-mile board speedway, which has been erected by C. W. Johnson, a Uniontown capitalist, will be opened Thanksgiving day for the local meet. This speedway is a regulation board type, designed and built by Jack Prince of bicycle fame. Although Uniontown is a city of 20,000 it has a population of 400,000 within a 5-mile radius. Pittsburgh is not far distant and the attendance is expected to be good.

Aitken Now Leads in Championship

Is 120 Points Ahead of Resta

NEW YORK, Oct. 2—Johnny Aitken, of the Indianapolis Speedway racing team, now leads the list in the 1916 racing championships. Aitken was running third previous to the Astor cup race Saturday, but by winning this race he gained 800 points and so took first position away from Dario Resta, who was leading with 2,400 points. Aitken now has 2,520 points to his record.

The order of championship standing is as follows:

Aitken	2,520	Mulford	620
Resta	2,400	Christaens	540
E. Rickenbacker	1,990	Henderson	517
De Palma	1,790	Vail	440
D'Alene	1,120	Lewis	380
Milton	690	Galvin	340
Adams	55	Devigne	320
Cooper	55	Hughes	275
Wilcox	40	Buzane	210
Chandler	40	O'Donnell	185
Watson	35	Devlin	140
Sorrenson	35	Klein	125
Johnson	30	Lecain	120
Gable	30	Oldfield	80
Devene	30	Taft	75
McCarthy	25	Pullen	70
Muller	20	Stringer	55

SUIT ON AUTO PARTS NAME

Chicago, Sept. 29—Confusion caused by the use of the words "auto" and "parts" by manufacturers and dealers of parts and accessories for motor cars, has resulted in legal action to determine the right to use the words as part of a trade name. The Auto Parts Co., Chicago, has recently filed suit against the Auto Sales and Parts Co., also of this city, asking that the latter concern be restrained from continuing. business under the present name.

Ruckstell and his mechanic crawl out from under their overturned Mercer. Ruckstell was slightly bruised, but his assistant was uninjured

Alcohol Best Engine Fuel

Convening Chemists Declare Sawdust Product Logical Substitute for Gasoline

NEW YORK CITY, Sept. 29—Alcohol is a possible substitute for gasoline, according to some of the chemists attending the National Exposition of Chemical Industries in this city, who believe it the only fuel in sight which promises to take the place, or hold down the price of, gasoline. Dr. A. D. Little of Boston declared alcohol to be the best fuel for internal combustion engines, as benzol, which had been suggested as a substitute for gasoline, is not sufficiently plentiful to keep the large number of motor cars in this country going 2 days. Kerosene, he added, was out of the question.

From 1912 to 1915 the production of completely denatured and specially denatured alcohol rose from 8,000,000 gallons to 14,000,000 gallons a year. Alcohol is being made from sawdust, according to A. H. Comey, chemist at the Du Pont Powder Co.'s laboratory. In the yellow pine district alone there is enough material wasted to make 600,000 gallons of alcohol a day, and there are 10,000,000 tons of material available every year in this country, from which alcohol can be made, Dr. Little said.

SAVANNAH GAS DOWN

Savannah, Ga., Sept. 30—Advices of a further reduction of 1 cent in the price of gasoline, beginning Monday, September 25, was received last week by the Savannah agencies of the Gulf Refining Co. and the Standard Oil Co. The wholesale price went from 20 cents to 19 cents a gallon, bringing the retail cost down to 21 cents.

The oil, after a rapid rise, slowly began dropping in cost 2 months ago, and it is predicted it will go to 15 cents a gallon before steadying. New wells opened in Texas and Oklahoma are said to be the cause of the decrease in price.

NATURAL GAS FUEL INCREASES

Washington, Oct. 1—Considerable interest attaches to statistics compiled by the United States Geological Survey showing that the year 1915 was one of decided expansion for the casing head gasoline industry. The quantity of raw gasoline extracted from natural gas and sold in that year amounted to 65,364,665 gallons, a gain of 22,712,033 gallons, or 53 per cent, over the quantity marketed in 1914.

The average price received for the unblended product at the sources of production was 7.9 cents a gallon, and the market value of the entire output was $5,150,823, a gain of 0.6 per cent in average unit price and of $2,044,914, or 66 per cent in total market value, compared with 1914.

The volume of natural gas utilized in the manufacture of this quantity of gasoline, exclusive of that recovered as drips from gas mains, is estimated at more than 24,000,000,000 cubic feet, and the average recovery of gasoline per thousand feet was 2.57 gallons.

The number of plants for the manufacture of gasoline from natural gas increased from 386 at the beginning of 1915 to 414 at the end of the year, a gain of only 7 per cent, but the combined daily capacity of the plants increased from 179,353 to 232,336 gallons, about 30 per cent, as a consequence of the fact that many of them operated during only a part of 1914.

CHICAGO GAS LOW GRADE?

Chicago, Sept. 30—Figures showing that adulterated or poor quality gasoline may be costing Chicago motorists hundreds of thousands of dollars annually have been prepared by A. C. Parker, chairman of the touring and signboard committees of the Chicago Motor Club. He believes an ordinance of the kind now being prepared by Alderman Thomas J. Lynch of the Thirty-fifth Ward to prohibit fraudulent blending of gasoline and to compel honest certification of the grade of the product offered for sale will save motor owners the greater portion of the money now wasted for inferior fuel.

MOTOR CARS TO USE LIQUOR

Kansas City, Oct. 3—Hutchinson, Kan., no longer annoys the men with thirsts who lament the waste of whisky and beer in Kansas. Heretofore these liquors have been poured into the gutter to tease with their aroma. But the advent of the motor car has brought a new means of disposing of confiscated booze. Mayor A. G. Gleadall, of Hutchinson, is the genius who has discovered the new use for liquor. He has ordered it all saved and stored—and will put it in the radiators of the city's motor cars to take the place of anti-freeze "dope" which the city has been buying

Incidentally, he is also setting a good example with respect to broken bottles. The bottles in which booze was bought will no longer be smashed—with danger of the pieces eventually getting on highways—but emptied and sold to a local bottling works which will put into them non-intoxicating drinks.

CUTS PRICE; CAN'T GET GAS

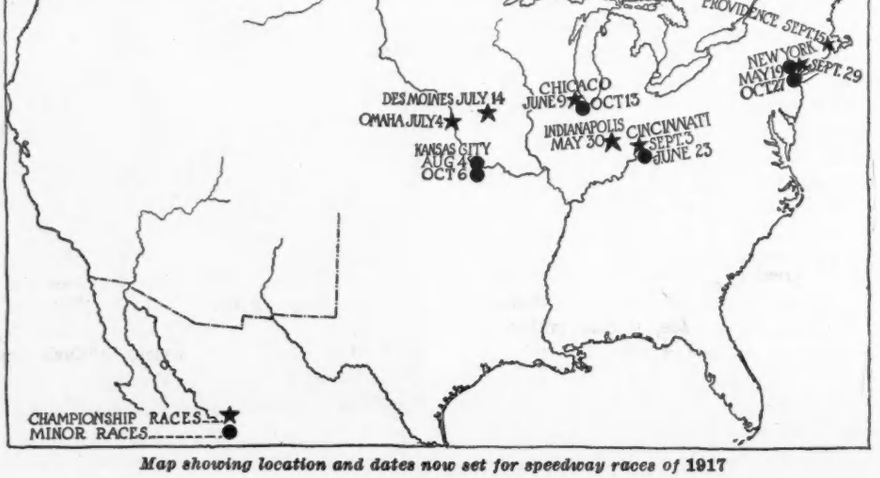
Savannah, Ga., Sept. 30—The Johnson Gewinner Co., Atlanta, Ga., which came into the limelight a short time ago through a fight with the oil-producing companies which refused to supply it with gasoline because it cut the price, has the same trouble on its hands again. The company has continued to cut the price and advertise it prominently. Now the producing companies have again cut off its supply, and it has again appealed to the federal trade commission through William J. Harris, the Georgia member.

MORSE IN CHALMERS SALES

Detroit, Mich., Oct. 3—Special telegram—E. C. Morse has been elected vice-president of the selling division of the Chalmers company and has resigned as sales manager of the Hudson Motor Car Co. He takes the position made vacant by the death of Paul Smith last July and will have charge of sales

TO MAKE KENT CAR

New York, Sept. 29—The Kent Motors Corp. has been formed here to manufacture a four-cylinder touring and roadster model at $985. A plant site has been purchased in Newark, N. J., and it is stated a plant to produce 5,000 cars a year will be started at once. Production of cars will be started about January 1. The company will absorb the Kent Motors Corp. of New York which heretofore has been a dealer, handling at various times the Pullman, the Abbot-Detroit and the Elcar;


TACOMA JULY 28
PROVIDENCE SEPT 15-23
NEW YORK MAY 19 SEPT. 29 OCT. 21
DES MOINES JULY 14
OMAHA JULY 4
CHICAGO JUNE 9 OCT 13
INDIANAPOLIS MAY 30
CINCINNATI SEPT. 5 JUNE 23
KANSAS CITY AUG 4 OCT 6
CHAMPIONSHIP RACES
MINOR RACES

Map showing location and dates now set for speedway races of 1917

distribution of the Elcar will be continued for the time. F. H. Clarke, president of the old company, is preisdent of the new one and associated with him as directors are: Wallace A. Hood; Major A. White, president New York Plate Glass Co., president of the City of New York Insurance Co., and vice-president of Madison Trust Co.; Thomas L. Raymond, Mayor of Newark, N. J.; P. P. Dean, chief supervising engineer; L. A. D. Percival, president Amalgmated Paint Co., New York; R. J. Cosgrove, formerly of the Ford Motor Co.; Lloyd H. Foster, factory superintendent, formerly of Hupp Motor Car Co., and Briscoe Motor Co.; Alex. U. Conquest, formerly assistant engineer, Daimler Motor Works, England.

The car will have a Continental 3¾ by 5 motor equipped with Bosch magneto and Bosch lighting and starting and Zenith carbureter. Other specifications are: Borg & Beck clutch, Grant-Lees gearset, Timken axles, Gemmer steering gear. The wheelbase will be 116 inches on 32 by 4 tires and rear springs will be three-quarter elliptic. Equipment includes top, slanting windsheld, Stewart speedometer, 8-day clock and the usual tools.

WARNER OAKLAND HEAD

Pontiac, Mich., Sept. 29—Fred W. Warner has been elected president of the Oakland Motor Car Co., succeeding C. W. Nash, who resigned some time ago. Warner has been general manager of the company since June, 1915, when Mr. Nash promoted him to that position from that of general sales manager. Previous to coming to the Oakland organization Mr. Warner made a most creditable record as manager of the Chicago branch of the Buick Motor Co.

At the same time of the promotion of Warner, the Oakland company announces that C. B. Voorhis, who has been its general sales manager, is promoted vice-president of the company. Both Warner and Voorhis have also been made members of the board of directors.

Voorhis came to the Oakland company from the Kingman Plow Co., Peoria, Ill. He became assistant sales manager of the Oakland company, and in June, 1915, was made general sales manager.

COUZENS DETROIT'S POLICE CHIEF

Detroit, Sept. 30—James Couzens, formerly vice-president and general manager of the Ford Motor Co., of which he was also one of the founders, has been named chief of police of Detroit, owing to the resignation of Commissioner John Gillispie. The appointment of Mr. Couzens came as a great surprise to Detroiters, and it is said that this is the first time that a man of such prominence, a multi-millionaire, has been named a chief of police. Under Mr. Couzens' management it is expected that great improvements will be made, not only in matters concerning the police department, but in other branches.

Study Mail Equipment

Two Committees Tour Cities to Find Their Particular Needs

Government Buys Postal Trucks Upon Recommendations of These Bodies

WASHINGTON, Oct. 2—The work of motorizing the delivery equipment of the Post Office Department by government-owned and operated trucks has begun in earnest. The work is in the hands of two committees of three men each. The first, headed by Frank Galbraith, Chicago, and Messrs. Simmons and Phalan of Minneapolis and New York, respectively, makes a study of the equipment of the various cities and decides which one shall be motorized first and the order in which it shall be done.

The recommendations of this committee are then passed on to the second committee. This is headed by Charles Stearn, chairman, F. B. Clark and J. A. Rundle, master mechanic. These men decide the number and the types of vehicles necessary to best carry on the work.

So far the cities of Pittsburgh, Pa., Atlantic City, N. J., and Nashville, Tenn., have been studied and trucks bought for the work and those localities.

Eighteen Fords, ten ¾-ton Whites and three 1½-ton Packards have been purchased for service in Pittsburgh. Twelve Fords have been bought for use in Atlantic City and three ¾-ton Whites for the work in Nashville. In addition a new garage site having 40,000 square feet of area has been selected in Philadelphia and a similar garage site in Detroit.

The two committees mentioned above will travel from city to city in their work of investigating the present equipment and the motor vehicles required to replace it. They are now about to begin their study in Boston, Mass.

COLUMBIA MOTORS BUYS ARGO

Detroit, Mich., Oct. 2—The Columbia motors Co., Detroit, has purchased the Argo Electric Vehicle Co., Saginaw, Mich. The merger gives Columbia Motors a membership in the National Automobile Chamber of Commerce, allowing them to exhibit their product in the national shows in New York and Chicago this next winter, and in addition assures an early manufacture of the new car.

The first Columbia six was produced this past summer but further production has been held up pending the Argo absorption. The original car, equipped with six-cylinder Continental motor, Timken axles, 115-inch wheelbase and a tilted windshield, has traveled approximately 60,000 miles of test driving and stood its work well according to engineers' reports.

Actual manufacture and delivery is planned to begin January 1, 1917. The first year's production will be 3,500 cars and the price will be about $1,000. The officers of the company are: J. G. Bayerline, president and general manager; A. T. O'Connor, secretary and treasurer; T. A. Bollinger, vice-president in charge of manufacturing; Walter L. Daly, sales manager; Ray Long, chief engineer; W. E. Metzger, vice-president and John Mohrhardt, superintendent.

TO USE RAYFIELD CARBURETER

Connersville, Ind., Oct. 3—The Lexington-Howard Co. of Connersville, Ind., has added the Rayfield carbureter to its equipment.

NEW METZ COSTS $545

New York City, Oct. 1—The 1917 Metz will sell at $545, f. o. b. factory, a reduction of $55. The model will have a balanced crankshaft and the reciprocating parts of the motor have been lightened. The body lines are improved. A new centilating hood has been provided with nickel plated clamps. The car has metal hood sills. The metal-covered windshield board has been enameled. The steering column brackets have been improved and an electric dashlight has been placed on the instrument board. Pockets have been placed in the tonneau.

The standard wheel color is vermillion, with an option of white or purple blue. Either wire or artillery wheels may be had. The front guards are made to curve gracefully over the wheels and blend into the body sides by the use of a steel apron that protects the occupants of the car.

The above price does not include demountable rims.

OTHER FORD CHANGES EXPECTED

Detroit, Sept. 29—Changes in the equipment of Ford cars are expected to be announced by the Ford Motor Co. soon. From an out-of-town Ford distributor it was learned that instead of front tires 30 by 3 inches and rear tires 30 by 3½ inches the latter sized tires will be fitted to all wheels. A new ventilating windshield and a mohair top are other changes to be announced.

CHEVROLET'S NEW CAR READY SOON

Plainfield, N. J., Sept. 30—The American Motors Corp., of which Louis Chevrolet is vice-president and chief engineer, has completed its factory here. The new plant occupies 4½ acres and includes an assembly building of the most improved mill construction, 400 by 60 feet long, an administration building and power house. It has been laid out according to the plans and specifications of the company's own engineers and has a capacity of 10,000 cars yearly.

During the last 3 months this company has been quietly completing its organization and laying its plans for production

on a large scale. As finally announced by Mr. Chevrolet it will put upon the market a five-passenger, six-cylinder car priced at about $1,100. Distinctive lines, a wheelbase of 122 inches and a motor for which exceptional efficiency is claimed are features of the model. The company plans to produce 250 cars before the first of the year when deliveries will begin in quantities. The total output for the first year will be in excess of 3,000 cars.

Marcus I. Brock, who was prominent in the Association of Licensed Automobile Manufacturers and once sales manager with the Autocar Co. and the E. R. Thomas Co., has been appointed director of sales. John C. Speirs, formerly general manager of the Autocar Co. and factory manager of the Locomobile company, Mercer, S. G. V. and Standard Roller Bearing companies, is general manager in charge of production.

HARROUN GETS BRITISH ORDER

New York, Sept. 30—A contract involving the exporting of 2,000 Harroun motor cars per annum for 5 years and a total of $5,000,000 was entered into this week between the Harroun Motors Corp. and Speyer, Cole & Co., in association with Graham & Co., London, and Norton Lilly & Co., New York.

The contract provides for the exclusive dealing in Harroun cars in England and the colonies except Canada. For 8 years, these concerns have been the export dealers and managers for the Hupmobile company, which they will continue to handle.

HUPP PROGRESSES WESTWARD

Detroit, Mich., Oct. 2—The Hupmobile United America car left Minneapolis on its way westward with Pierre, S. D., for its next destination. From Pierre it goes to Seattle, Wash.

The capital-to-capital car covered its 5,000-mile mark between Des Moines, Ia., and Minneapolis on the thirtieth day of its trip, the 28th of September.

Thousand Cars in Run

Kansas City Bankers Conduct Monster Parade of 1,200 Vehicles

Dangerous Points in Route Were Specially Well Guarded

KANSAS CITY, Oct. 3—Despite the fact that many persons said such a thing was impossible the American Bankers' Association paraded to Longview Farm, 23 miles from Kansas City, over Jackson county's finest rock roads on September 27. The task of routing over 1,200 cars through the streets of Kansas City and over the roads of the county was ably handled by city police officials with the coöperation of the county highway officials.

The county court placed more than 50 men at the disposal of the district road engineers. These men were taken from their regular duties on the roads and stationed, with American flags, at every sharp curve, all dangerous places and at each important intersection to warn and point out the way to the farm. Three county motor cars were stationed at important points or kept running along the parade's course to be ready to render aid wherever needed.

Every tire service company in Kansas City which operates free tire service cars had motor cars along the line of the parade. Each car was stocked with tires and tubes for various size wheels. Their being on the spot in many instances brought in some good tire sales, and none of the service cars went back as heavily loaded as it had started out.

The space given over to parking the cars at Longview was soon overflowing and any handy pasture was utilized by the late comers, which soon made it necessary to resort to the sides of the county road, which were lined with parked cars for several blocks.

The bankers were entertained at lunch by the Clearing House Association of Kansas City and many hungry ones were evident after 5,500 lunches had vanished.

Not only has the Hupmobile met rain and mud but makeshift bridges such as this illustration shows. The bridge was nothing but an uncertain plankway laid across the ditch. As is evident, the Hupmobile was unable to avoid the air holes in the flooring

HIGHWAY INSPECTION STARTS

Russelville, Ala., Oct. 3—Pathfinders inspecting the Jackson highway arrived here at 9 o'clock after a 2-hour drive from Florence, Ala., over roads that were a revelation to the party who made the pathfinding trip last year. Roads that a year ago were so rough and rocky as to be almost impassible now have been replaced by new ones that are the acme of mountain road engineering from the standpoint of quality. They can be compared to boulevards with all due respect for veracity.

School children greeted the party here upon its arrival. Yesterday's run from Nashville to Florence, 124 miles, was made over fine roads. It shows what competition will do in the way of offering an incentive to do real work. Mississippi and Alabama both want the designated route, and each has had a year of probation. The results are astonishing and well worth adopting where competition routes are possible.

HARRY NEWMAN RESUMES PRESIDENCY

Chicago, Sept. 29—Harry Newman today again took up his position as president of Harry Newman, Inc. Differences over distribution plans for the Chalmers car led to his resignation 2 weeks ago. The board of directors met yesterday and asked Mr. Newman to reconsider his resignation.

FISK INCREASES CAPITAL

Springfield, Mass., Oct. 2—Stockholders of the Fisk Rubber Co., voted today to increase the capital stock by $24,500,000, the new cash to be used for working capital. The new stock is made up of $7,500,000 first preferred convertible and $5,000,000 second preferred of which $2,500,000 will be issued and $21,000,000 common stock which will remain in the treasury. The additional issue of second preferred is taken by security holders on a basis of one share for every four shares of common and second preferred. First preferred has been underwritten by a syndicate headed by Estabrook & Co., of Boston.

NEW CLUB FOR DETROIT

Detroit, Sept. 29—A new motor club is being formed here. The matter has been under consideration and discussion for several months and now it is announced that W. S. Gilbreath, who was manager of the Hoosier Motor Club, Indianapolis, and latter, traveling secretary of the Dixie Highway Association, has been secured to take the preliminary steps towards the club's formation. It is likely that the name of the club will be Detroit Automobile club. A preliminary meeting was held this week.

Standardized Traffic Rules

Motor Age's Campaign Bearing Fruit—Two Readers Recite Experiences and Offer Suggestions

CLINTON, Ia.—Editor Motor Age—A move in the right direction—"Standardizing Traffic Rules"—and in assistance to this end allow me to recite an incidence that is detrimental to the tourists on the great Lincoln highway. My statement will be sworn to if necessary, and is for use in any way you see fit.

In passing through Morrison, Ill., the writer stopped at the hotel. The hotel stood on a corner and to turn around, I went to the center of the street intersection, turning around the center.

When leaving the hotel the city marshal stood looking at me, within reaching distance of my car. The motor was started, and with notice by look and signal, I turned around the corner and back up the street I came down on, interfering with no vehicle or person, the speed not to exceed 3 miles per hour in turning. I was hailed and stopped as the turn was finished, by the marshal still standing at the point I left, and asked if I knew I had committed an offense.

I, of course, did not, and asked what it was. I was told I had turned inside the intersections. I thanked him for the caution and made known the fact that I would not let it happen again. This did not settle it, however, and I was hauled before a justice of peace and fined.

Recites Driving Rule

I recited the driving rules of the first cities in the east and west, giving Chicago rules for the downtown districts, trying to bring out that the turn I made had been correct. I was termed a liar by the judge, who stated he did not believe that my statements were correct. I paid the fine, under protest, to avoid delay. Later, I told the mayor of the hardships the city was working on tourists, and that I intended to endeavor to have this clause of the ordinance changed to correspond with the customary acts in other cities, stating that, in any event, a tourist should be cautioned and fined only if the offense were repeated. There have been many cases of similar fines this season for this offense, in Morrison. In my case the officer violated his office by not stopping me with a word before the act was completed.

I later took it up with the leading Iowa Lincoln highway official who, even though out of his domain, took it up personally with the leading citizens there and found it all to be as I have stated, but there seems to be a lack of control that the citizens cannot overcome. Anyway no change occurred and fines continue.

The writer believes in fining reckless drivers, speed bugs, etc., and has driven through most every city of size within a radius of 500 miles and since 1904 has met with no accident or arrest. Being a caterer to tourists and their interests, I take this before you to stamp out the bars to pleasure.—H. Jacobs.

NEW TRAFFIC PLAN FOR N. Y.

New York, Sept. 30—Isles of safety are now put at the intersections of Ffth Avenue and Forty-third, and each alternate cross street as far north of Fifty-ninth, to help solve the night traffic problem due to the increased vehicle travel caused by the street car strike. These isles of safety render it possible to withdraw traffic policemen from these points for other duties.

Traffic Squad for Large Cities

In addition to the general traffic duties to be performed by all policemen there are special duties which require a trained body of men—a traffic squad. This should consist of men on foot, on horses, on bicycles, and on motorcycles, with activities as follows:

The men on foot should regulate traffic at street intersections and other congested points. This can be done successfully only by officers who have had special training.

The mounted men should patrol and exercise general supervision over traffic. Being higher up they can see better than men on foot and are most valuable in reprimanding drivers for offenses and in teaching them to observe the regulations. Horses must be especially trained for this work, as well as the officers.

A well-trained mounted squad of police is essential to every large city. They should not be on stationary duty; rather they should move about to be of the most value.

The men on bicycles should also patrol and exercise general supervision over traffic. Their flexibility and speed enable them to cover a large territory. The duties of the motorcycle squad is somewhat similar.

Bureau of Street Traffic

Every city should have a bureau of street traffic to examine and license drivers of public vehicles, inforce regulations, control street and sidewalk obstructions and keep a record of all accidents for the purpose of fixing the blame, tabulating them and determining as far as possible why they occur, with a view to devising means to prevent their reoccurrence. To keep efficient records of accidents, complaints, violations and arrests, a set of forms must be adopted, these to be uniform throughout.

ROCKFORD, Ill.—Editor Motor Age—I am exceedingly glad to note the campaign you are starting in regard to universal traffic regulations.

I have just returned from a 1,500-mile trip throughout Missouri and Arkansas and I had extremely annoying occurrences when endeavoring to pass cars and teams in Missouri.

Upon giving signal that I intended to pass, drivers in a great number of cases deliberately turned to the left and blocked the road, compelling me to pass on the right side. In several cases in Missouri when meeting teams, in place of pulling to the left, they would pull to the right and make me pass on the left side.

I have a suggestion to offer and that is, as there is quite a universal agitation going on in reference to the building of highways following old, established trails, it seems that it might be possible to arrive at a few standard rules that could be printed on the same posts that the highway flags are printed on, stating "keep to the right" and "pass to the left."

Also, many of the small towns in Missouri have signs of speed limitations—six, seven, eight and ten miles per hour. When you are touring through a state and trying to get to your destination before nightfall, it is exasperating to run into these speed traps where such idiotic limitations are placed upon the speed. Let us attempt to have a standard limitation.

I retaliated by never purchasing gasoline or supplies in any town where they had an unfair speed notice and invariably went on to the next place if it were possible to do so.—A. A. Martin, president, Union Products Co.

WHAT THEY DO IN RIO

Minneapolis, Minn., Sept. 30 — C. M. Mauseau, former general manager of the Northwestern Telephone Co., and now holding a similar position in Rio de Janeiro, Brazil, commented on the difference in traffic regulation here and in Rio, as follows:

"They have no parking nuisance in Rio. The reason is simple; no car may be left in the streets without an occupant. You can bring your wife's nephew or your gardener or your chauffeur down town, but you will lose your car temporarily and get fined or perhaps jailed if it is wholly deserted. The public cars are parked in the Avenida, Rio Branco, the civic center, but these, too, must be attended."

He added that there are fewer cars in Rio than here.

Sixth City Makes Rapid Progress

Part II

THE Chandler company, which has had such a phenomenal growth, has new enlargements under way which will give a capacity of eighty to one hundred cars per day for the spring—one new four-story building 500 by 60 feet will be built for general assembly work, and will be ready for spring production. In addition a special service building 160 by 160 and one-story is being added.

Many people have the misapprehension that Chandler is an assembled car, and that motors, axles, gearsets, etc., reach the factory as assembled units ready to be incorporated in the car. This is not so. All of these units, with the exception of the gearset, are not only assembled in the Chandler factory but the machining work done in plants working especially for the Chandler organization. One of these is the H. J. Walker Mfg. Co., whose factory joins the Chandler. This Walker plant is a huge machine shop, 260 by 120 feet, employing 500 men. Over $100,000 worth of new machinery is being added, and over $125,000 worth of new machinery was added in the last 6 months. Much of the Chandler machining is done in this factory and the assembly in the Chandler plant. Rear axles are entirely assembled in the Chandler factory, as are front axles. In the motor testing department the twenty-eight testing blocks are constantly filled. Adjoining the Chandler factory is a small factory of the Briggs Mfg. Co. to take care of the Chandler bodies. The bodies are built at the Detroit plant of the Briggs company and the small Briggs factory adjoining the Chandler is for final painting and trimming. This plant does nothing but Chandler jobs. The growth of the Chandler factory has been one of the most rapid in Cleveland. The factory was started in February, 1913, and first cars were shipped July, 1913. Last year production was 8,000, this year 15,000, and next year the figure aimed at is 20,000.

Jordan Reaches Schedule

The new Jordan factory is at present producing six to seven cars a day and by October 1 will be at its schedule of ten cars per day. The first car was turned out August 14, and on September 1, just 2 weeks later, the schedule was three cars per day. The factory is a new structure, 30,000 square feet floor space. Ground was broken on April 5, and the factory occupied May 25. Between 90 and 100 men are working at present. Sixteen chassis are going through assembly at the same time. The company has a good stock of materials ready, more than 100 frame and other materials in like proportion being on hand. The bodies are finished in two standard colors, maroon and green. The bodies are received at the factory minus the finishing coat, and two special body painters from the body company give them these final touches. Seventy-five per cent of the cars are shipped with wire wheels. The company plans to build 2,000 cars and reports all but 129 of these already contracted for. At present there are 30 to 35 dealers.

The Perfection Spring Co., one of the largest spring producers, has worked many changes in its factory organization and equipment during the past year. One of the most important of these is the introduction of the committee system of management in contrast with individual management of the different departments. There is an executive committee for the general management of which Christian Girl, president of the company, is a member ex-officio. Such departments as purchasing, sales, engineering, factory management, etc., instead of being in the hands of an individual, are in the hands of committees. The system has been working for some months and is giving good satisfaction. Committee management, while new in the motor car field, is not new in the industrial world, and has been worked with satisfaction by many large organizations. There is a regular schedule of committee meetings, all taking place during office hours and constituting a part of office work. Committees consist of three to five or more members, according to the work.

One of the leading advantages of committee work is that broader consideration is frequently given to many factory matters. For example, in the purchasing department it might be possible for an individual purchasing agent to favor one firm over another, due to old friendships or other reasons, but such favoritism is scarcely possible under the committee system. The committee work has been carried on to the extent of salary increases being handled by committee rather than by an individual.

In its factory the Perfection Spring Co. has made many changes. One of the most important is the unit system of spring manufacture. In this system the factory is divided into rectangular areas, each area constituting a unit in spring manufacture. The capacity of each unit is one finished spring every minute for the 24 hours of the day, or 1,400 springs per unit per day. At present six of these units are operated. Each unit can take raw spring stock from the stock room and have it converted into a completed spring and in the shipping room in 4 hours. By this unit system of manufacture, it has been possible to apply the latest efficiency factory methods. Motion study has largely entered into the work and three improvements have been incorporated into each unit. These improvements are all for conveyor systems of doing work faster. For example there are conveyor furnaces for heating the leaves of steel that go into the spring; there are conveyor ovens for annealing these leaves; and there are conveyor tables to hasten the assembly of the leaves, forming the complete spring.

In the conveyor furnaces the cold steel strips from which the leaves are formed are fed into the furnace at one side, they slowly travel through it, being heated as necessary, and come out at the other side, red or white-hot as necessary, and ready to be bent or cambered into proper shape. If the grade of steel varies, the speed of going through the furnace also must vary. The conveyor annealing ovens operate on the same system. The annealing ovens are for proper tempering of the springs.

The conveyor assembly table is a huge table along the sides of which are twenty-one men whose work it is to put the leaves together and add center bolts, clips, bushings for the eyes, etc. In addition to bringing parts together small milling operations, such as bushing the sides of the eye, are done. The leaves are also graphited. After leaving the conveyor table the spring is given its test.

Perfection Spring Adds to Efficiency

Another feature which has been added during the past year is a huge steel stock room which is a separate building and into which all of the steel stock coming from the steel factories is placed. It is rectangular in shape, one story high, but measuring 42 feet from the floor to the roof. From end to end along either side of the central aisle are central stacks of steel in flat bars ready to be cut into lengths for spring leaves. There is capacity for 80,000 tons of steel of this stock. Overhead is a huge traveling crane operating from end to end. This crane picks the steel stock direct from the railroad cars, which enter a bay in the side of the building. The stock is deposited to where needed.

Along the center aisles are various electrically-operated cutting machines which cut the steel stock into necessary lengths for springs. These cutting machines are on the central track and can be moved along to any point closest to the particular stock that has to be cut. The cut stock is then transported by electric trucks to the necessary parts of the factory.

One of the new Cleveland truck concerns is the Deneen Motor Co., an organization with $225,000 capital, which is building two models of trucks. The factory occupied is a one-story building with 25,000 feet of floor space and formerly used as railroad shops. The concern is just starting delivery on its 1¼-ton truck and is bringing out a new 1000-pound vehicle. Manufacturing plans are to build 1,000 of the former and 5,000 of the latter. Present capacity is ten trucks per day. The company is under the management of F. S. Deneen, who for 5 years was connected with the engineering department of Chal-

mers, and later with the Ferro company of this city. Possession was obtained of the present factory 6 months ago, and the development of the truck has been under way for the past 18 months. A feature of the trucks is that they are sold with complete electrical equipment, including starting and lighting. The storage battery is carried on a spring mounting to overcome truck vibration. The generator is driven at engine speed and is regulated to start battery charging at 5.5 miles per hour and to be at its maximum charging rate of 12 to 14 amperes at 11 miles per hours, a rather low running speed.

Standard Welding Co. Adds

The Standard Welding Co., manufacturer of all kinds of rims for passenger cars and commercial vehicles, has practically doubled its factory during the past year and has added about $250,000 worth of new manufacturing machinery. Approximately 85 per cent of this plant has been operating night and day for the last 6 months, prior to which time 75 per cent of the plant was on night shift for several years. Today 2,500 men are employed, and the floor area of the factory is 11 acres. There is a capacity for 15,000 rims for passenger cars per day. In addition there is capacity for 1,500 bands for truck wheels and 1,200 bases for truck wheels per working day, a large output when the total product is considered.

The entire Standard Welding plant is not given over exclusively to the manufacture of rims, but there is a large production of metal tubing. The factory produces 3,500,000 to 4,000,000 feet of tubing per month. The company has not experienced any shortage of material and at present has over $1,000,000 worth of steel stock on hand. It ships 15 to 16 carloads of finished product per day, and has three railroad sidings for accommodations for fifty cars, thus eliminating danger of shortage on that score.

Four H. A. L. Cars Daily

The H. A. Lozier Co., which started deliveries of the H. A. L. car last April, is now turning out four cars per day and hopes to be on a schedule of six in a short time. The factory is located on the second floor of the old Royal plant and employs upwards of 300 men. It is expected that the production for the fiscal year of April to April will be 1,000 cars. Already a selling organization covering approximately half the country and embracing upwards of forty dealers has been organized by the concern.

The Baker R. & L. Co., which a year ago secured a license for the manufacture of Owen-Magnetic cars, started the delivery of these early last spring and has now an output of sixty cars per month. This is being increased each month. The electrical transmission systems for these are manufactured in the Fort Wayne plant of the General Electric. All bodies, including those of the closed types, are built in the R. & L. plant.

Denver Congestion Is Not Bad

So No Municipal Parking Spaces Have Been Set Aside

DENVER, Col., Sept. 28—The problem of parking motor cars in Denver's downtown streets is demanding much extra attention from the city authorities in direct charge of traffic, but congestion is not yet regarded as serious enough here to require setting aside municipal parking spaces.

A bill for a new ordinance was recently framed with provisions to make street parking far more restricted than it is now, but this has been tinkered by numerous committees in conference with the city council until much of its original force has been destroyed, and just this week the city council amended the pending measure to open up the parking regulations so that traffic experts claim that this portion of the bill provides for scarcely any improvement over present conditions. Many motorists declare that no change is needed in this respect.

The proposed ordinance originally set a limit of 30 minutes for leaving cars along the curb on the more congested streets and 1 hour on the less congested streets in the downtown district, and also provided for parking in the middle of streets without street car lines, where parking spaces for individual cars would be clearly marked on the pavement. The latest amendment abolishes the middle parking plan entirely and allows 2 hours for leaving cars stand on any street, except where a few danger zones are arbitrarily specified as prohibitive of parking. Such danger points are now indicated by special signs placed on the curb by authority of the manager of safety, and are principally along Curtis street, which has street car tracks and has extra heavy traffic of all kinds because it is the main thoroughfare for the larger moving picture theaters. Traffic officers declare the 2-hour allowance uncalled for and such a limit destined to be practically impossible to enforce with a reasonable degree of thoroughness.

Experiments With Parking

The plan of parking cars in the middle of streets without street car lines is strongly favored by Manager of Safety Dewey C. Bailey, Chief of Police Hamilton Armstrong and Traffic Sergeant Robert W. Thompson, who have been experimenting with this method on one block of Champa street for a few weeks. The system has not been given a fair trial, however, as the present traffic law gives no authority to keep the curb portion of the street entirely clear and many patriotic citizens insist upon their rights to leave their cars along the curb on both sides of the street in this block, thus producing an impractical and sometimes dangerous condition because of the small space left open for travel and the extra difficulty of dodging cars starting out from where they are parked.

There is now no time limit whatever for leaving cars along the curb, although there is a restriction concerning manner of parking on streets having street car tracks. On such streets, a motor car must have both right wheels not farther than 1 foot from the curb, and each car must be at least 4 feet behind the car immediately in front. There are also the arbitrary spots designated by signs against parking cars, but these accomplish but little toward relieving congestion, being largely a special favor to the business concern which has a special permit to have the space in front kept clear.

Number of Cars Increases

The downtown streets in Denver are principally 48 and 50 feet from curb to curb. While there is not nearly such serious congestion as in some cities, what congestion there is has been growing rapidly during the last 2 or 3 years, on account of the tremendous increase in the number of cars owned in the city and also the big growth of tourist travel. Denver already has more than 11,000 cars registered for 1916, for example, as against about 8,000 for all of 1915.

Being a tourist center, Denver has the added problem of adopting simplified regulations easy to understand, easy to explain to strangers and easy to indicate, where necessary, by posting signs. This factor tends to make traffic officials, and others ambitious to make the city's streets as safe and convenient as possible for all users, look favorably upon the campaign announced by Motor Age to bring about a uniform traffic law for all cities large enough to need traffic regulations of any considerable scope. Meanwhile parking facilities for cars are felt to be sufficient without municipal spaces or stringent parking rules.

TACOMA RESTRICTS PARKING

Tacoma, Wash., Sept. 27—Parking spaces have been set aside on a number of different downtown streets, namely South Tenth street, one block; South Twelfth street, one block, and on South A. street between Tenth and Eleventh. On account of the increase in the number of motorists desiring to use parking spaces, the car lines will shortly be taken up on Commerce street and another three blocks will be devoted to parking. Machines are not permitted to remain for any length of time at the curb, and a number of business houses forbid them to stand in front of their places, while on streets where parking space is provided the cars must be parked in the center of the street.

Michigan's Marked Highways

Through the Land With a History Dating Back to Pere Marquette and La Salle

By D. A. Thomas of the Michigan State Highway Department

"WE WANT what we want when we want it," said a group of good roads enthusiasts in western Michigan about 3 years ago and proceeded forthwith to get it. They marked a route which they called the West Michigan pike, reaching from Berrien county in the south to the Straits of Mackinac and began to stimulate the improvement of the roads throughout the entire length. That they got what they wanted is shown by the fact that at the present time 75 per cent of the road is improved.

The route of the West Michigan pike lies through a country with a history dating back to the coming of Pere Marquette and La Salle, and rich in Indian lore. Through the north country the tourist may, at his option, follow the "scenic route," which leads for miles along the shore of Lake Michigan. As the end is neared, the pike traverses the resort region of Michigan, culminating at Mackinac Island, which is the objective point of the route.

How Roads Were Promoted

At about the same time that the West Michigan pike was conceived, a great interest in road improvement became manifest in eastern Michigan, where most of the motor cars come from. The car manufacturers and other interested persons began to practice what they preached. They had preached good roads to the country at large, whether intentionally or not, for the motor car has done more to influence the building of good roads than all other factors combined. Now they began to aid in the building of roads in the eastern section of the state and in the promotion of through routes.

The East Michigan pike, the twin brother of the West Michigan pike, was the result of this effort, and, like the Siamese twins, the two are joined together, meeting at historic Mackinac at the apex of the lower peninsula of Michigan. The lower portion of the East Michigan pike traverses the oldest settled parts of the state which are now covered with fertile farms and orchards. The road in this section is largely improved. In distinct contrast, however, the upper half of the pike leads largely through cut-over land where great stumps and here and there a towering trunk burned and charred by successive forest fires, bear testimony of the activity of former days. When the trail blazing tourists went over the route, they were called pikers, but they were far from it in the ordinary sense of the word for they gave liberally of time and money and aroused everyone with the project. The East and West Michigan pikes form the northern loop of the Dixie highway.

Joining the East Michigan pike at Bay City is the Huron Shore drive. Starting at Port Huron, this road skirts for miles the shores of Lake Huron and forms a beautiful shore drive through a thriving section of the state.

The Detroit-Chicago Highway Association, recently formed, has done much to promote a marked route between these two cities. The road lies along a route which boasts of many of the largest industries of the state, passing through Ann Arbor, Jackson, Battle Creek and Kalamazoo. In time it should form an important highway of commerce as well as a pleasure drive. Although among the newer ventures, it lies along a route much of which already has been improved.

Somewhat before the formation of the Detroit-Chicago Highway Association, promotion of a route from Grand Haven on Lake Michigan was begun, through Grand Rapids and Lansing, to Detroit, along what was known as the Grand River road, an already well-established thoroughfare. This road was renamed the Wolverine Pavedway, which, although somewhat of a misnomer at the present time, will soon be largely improved throughout the entire length. This route will serve to connect the second largest city of Michigan and the capital with the metropolis of the state.

The newest route in the state which is commanding attention is the Mackinac trail from Grand Rapids to the straits. While as yet but little has been done on this route, the movement has enthusiastic support and the outlook for an improved and marked route is bright. It will serve as alternative section of the Dixie highway.

Where Clover Grows

There is still a very important highway of Michigan yet to consider. It runs through the entire length of the upper peninsula and has been called by the picturesque name of the Cloverland trail. The western portion of this highway constitutes the longest stretch of nearly continuous improved road in the state today and passes through a region of surpassing natural beauty. Many miles of this road lie through virgin forest. The logged-out land which the road traverses is covered with thousands of acres of clover which has resulted from the scattering of the seed along the route by teams hauling hay to the lumber camps, whence the road received its name. The climate, the country and the roads combine to make a trip over the Cloverland trail an ideal vacation tour.

These various through roads have been largely marked with signs for the guidance of tourists and in some cases mapped, and construction encouraged, by voluntary organizations of those interested in the promotion of good roads. Although large sums have been contributed by individuals in several cases, the burden of actual construction, however, has fallen upon the counties and townships through which the roads pass, assisted by the system state rewards.

Under the highway laws now in force in Michigan, a bonus or reward is paid to counties and townships on all roads completed according to the specifications of the state highway department. There are seven classes of roads which can command rewards. These vary from earth of a certain standard to brick and concrete paved roads. The rewards vary from $250 to $3,400 per mile. The amount paid is not intended to cover the cost of construction but is in the nature of a reward to the county for improving the road.

A system of trunk-line highways, embracing some 3,000 miles of roads so laid out as to serve the state as a unit, is provided for. As an inducement to the construction of roads along these through

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$1,000,000 FOR NEVADA ROADS?

Reno, Nev., Sept. 29—Nevada people interested in the good roads movement, will get behind a constitutional amendment to be voted upon this fall which will increase the borrowing power of the state from $600,000 to $1,750,000. There is every indication that the amendment will carry and in the event of success, the next legislature will be asked to pass a comprehensive good roads bill creating a state highway commission, making an appropriation of $1,000,000 for state highways and directing the highway commission to supplement county road appropriations with money from the state road fund for road work of permanent character where such work forms part of a state road system. The state law will be so drawn as to harmonize with the recent federal act appropriating $75,000,000 for road work in the various states.

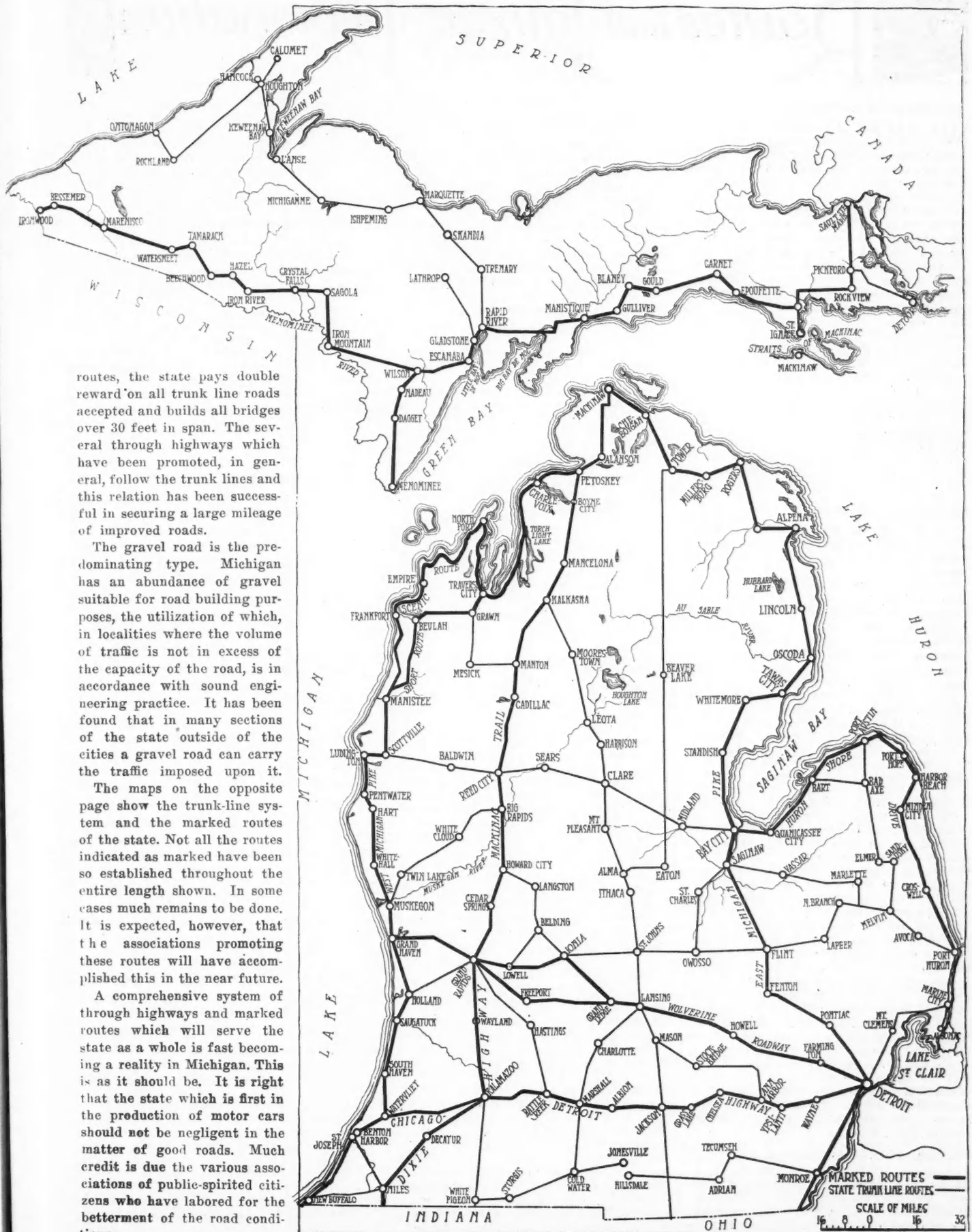
The value of good roads has been brought home to the people of the state by the tremendous traffic carried by the Lincoln highway. First in importance of the contemplated improvements will be that of the great transcontinental road.

routes, the state pays double reward on all trunk line roads accepted and builds all bridges over 30 feet in span. The several through highways which have been promoted, in general, follow the trunk lines and this relation has been successful in securing a large mileage of improved roads.

The gravel road is the predominating type. Michigan has an abundance of gravel suitable for road building purposes, the utilization of which, in localities where the volume of traffic is not in excess of the capacity of the road, is in accordance with sound engineering practice. It has been found that in many sections of the state outside of the cities a gravel road can carry the traffic imposed upon it.

The maps on the opposite page show the trunk-line system and the marked routes of the state. Not all the routes indicated as marked have been so established throughout the entire length shown. In some cases much remains to be done. It is expected, however, that the associations promoting these routes will have accomplished this in the near future.

A comprehensive system of through highways and marked routes which will serve the state as a whole is fast becoming a reality in Michigan. This is as it should be. It is right that the state which is first in the production of motor cars should not be negligent in the matter of good roads. Much credit is due the various associations of public-spirited citizens who have labored for the betterment of the road conditions.



Routes and Touring Information

Milwaukee, Wis.—California

WAUWATOSA, Wis.—Editor Motor Age—Kindly furnish us with the best route from Milwaukee, Wis., to California. Routes leading through the Southern and Southwestern states would be preferable.—E. P. Godfrey.

In going from Milwaukee to Southern California, we presume that you intend going to Los Angeles. The most satisfactory routing for you would be to go via Lake Geneva, Rockford, Dixon, then over to Davenport, and follow either the River to River road or Great White Way west through Davenport, Des Moines, Omaha, then over the O. L. D. Trail through Lincoln, Hastings, McCook, Sterling, Fort Morgan, into Denver, then south through Colorado Springs, Pueblo and Santa Fe. Then you have a choice of two routes from there to Los Angeles.

If you do not care to go via Omaha and Denver, a slightly more direct routing is to go through Davenport, Ottumwa, Chillicothe and Kansas City, then pick up the Santa Fe Trail to Pueblo.

Volume 4 of the Automobile Blue Book will give you complete running directions to Dixon, Ill., and Volume 5, from there on.

Chicago—New York

Corliss, Wis.— Editor Motor Age — Kindly give me complete information as to the best route from Chicago to New York.—H. G. Moore.

There are several ways of going from Chicago to New York, but you will probably find the most satisfactory by going through Valparaiso, South Bend, Goshen, Ligonier, Bryan, Wauseon, Toledo, Fremont, Clyde, Bellevue, Norwalk, Elyria, Cleveland, Painesville, Conneaut, Erie, Westfield, Jamestown, Salamanca, Olean, Hornell, Elmira, Waverly, Owego, Binghamton, Bainbridge, Unadilla, Oneonta, Stamford, Margaretville, Phoenicia, Kingston, Poughkeepsie, then down the east bank of the Hudson River to New York City.

Volumes 4 and 1 of the Automobile Blue Book will give you complete running directions for this trip.

Okmulgee, Okla.—Los Angeles

Okmulgee, Okla.—Editor Motor Age—Kindly advise me as to the best route from Okmulgee, Okla., to San Diego or Los Angeles. Also, which is the better route, via Salt Lake City or the Southern route?—W. M. Jackson.

In going to San Diego and Los Angeles, Salt Lake City is quite a bit out of your way.

Your most satisfactory routing would probably be to go west through Davenport, Chandler, Oklahoma City, El Reno, then follow the Ozark Trail west to Amarillo, going through Geary, Bridgeport, Weatherford, Indianapolis, Elk City, Sayre, Texola, Clarendon, to Amarillo. Take the direct route through Santa Rosa, Albuquerque, Magdalena, Springerville, Phoenix, Yuma, El Centro, to San Diego, then north through Del Mar, and Santa Ana, to Los Angeles.

We would advise your procuring Volume 5 of the Automobile Blue Book for this trip, which will give you the routing as well as the road conditions. This may be procured of the Automobile Blue Book Publishing Co., Mallers Bldg., Chicago.

Shawnee, Okla.—Los Angeles, Cal.

Shawnee, Okla.—Editor Motor Age—Kindly give information regarding a route and weather conditions from Shawnee, Okla., to Los Angeles, Cal. Can one make the trip and expect reasonably good roads during the month of October? Which route would you suggest for this time of the year, via Amarillo, Tex., or north to Newton, over the Santa Fe Trail.

Is there a road west from El Reno, Okla., straight north to Amarillo, Tex., or would it be necessary to go to Wichita Falls, Tex.?

Kindly advise what Automobile Blue Books would have to be obtained.—H. D. Reynolds.

In going to southern California in October, you will not have any difficulty as to road conditions. I think you will find the most agreeable routing would be to follow the Ozark Trail from El Reno west to Amarillo, which we understand has been put in good shape this summer, and then from Amarillo route via Clovia, Santa Rosa, Estancia, Albuquerque, Becker, Magdalena, Springerville, then you have a choice of two routes, one via Phoenix, Yuma, El Centro, San Diego, and the north route via the Grand Canyon.

Volume 5 of the Automobile Blue Book will give you complete running directions from Amarillo west.

Waupaca, Wis.—Ladysmith, Wis.

Waupaca, Wis.—Editor Motor Age—Kindly give the route from Waupaca, Wis., to Ladysmith, Wis.—R. E. Mather.

In going to Ladysmith, Wis., we advise that you go via Amherst, Stevens Point, Sherry, Marshfield, then north via Spencer and Unity to Abbotsford, then west through Withee, Thorpe, Stanley, to Chippewa Falls. From here go north to Eagle Point, Keystone, Salmbeau, Port Arthur, then to Ladysmith, Wis.

Volume 4 of the Automobile Blue Book will give you the routing from Waupaca to Eagle Point.

Belpre—Cincinnati, O.—Detroit, Mich.

Belpre, O.—Editor Motor Age—Kindly give me the best route from Belpre, O., to Cincinnati, O. Also from Belpre, O., to Detroit, Mich.—R. C. Hickman.

In going from Belpre, O., to Cincinnati, O., we advise that you go through Hocking, Coolville, Athens, Fisher, Albany, Prattsville, McArthur, Allensville, Ratcliffburg, then follow the Londonberry Pike into Chillicothe. From Chillicothe go through Hillsboro, Marathon, Milford, to Cincinnati, O.

In going from Belpre, O., to Detroit, Mich., we suggest you go via Athens, Nelsonville, Lancaster, Columbus, Worthington, Delaware, Norton, Marion, Sandusky, Fostoria, Moyne, Toledo, then east via Monroe, Trenton, then north to Detroit.

Volume 4 of the Automobile Blue Book will give you complete running directions for this trip.

Alva, Okla.—Jacksonville, Fla.

Alva, Okla.—Editor Motor Age—Kindly give the best route from Alva, Okla., to Jacksonville, Fla. I went last year via Indianapolis, Columbus, Hagerstown and Atlanta.—J. A. Stine.

I think you will find the best route to Jacksonville, Fla., is the way you went last year. In case you want to try a shorter route and a different one you will find fairly good road conditions by going east to Caldwell, then south via Pondcreek and Kingfisher to El Reno, Anadarko, Lawton, Wichita Falls, Bowie, Ft. Worth. Here turn east through Arlington to Dallas, then through Willspoint, Longview, Shreveport, Monroe, Vicksburg, to Jackson.

From Jackson drive via Newton to Meridian, then via Livingston, Demopolis, Uniontown, Safford, Orrville, Beloit, Selma, Autaugaville, Prattville, Montgomery, Opelika, then south via Columbus, Buena Vista, Oglethorpe, Hawkinsville, Abbeville, Douglas, Nicholls, Millwood, Waycross, Folkston, Callahan, to Jacksonville, Fla.

Volumes 5 and 6 of the Automobile Blue Book will give you the routing for this trip.

Fremont, Neb.—Black Hills

Leshora, Neb.—Editor Motor Age—Kindly give me a route from Fremont, Neb., through the Black Hills country, then to Pierre, Gettysburg, Seneca, Huron and Iroquois, S. D.—F. S. Fenerstwin.

From Fremont, Neb., drive west to Columbus, then through Norfolk, Pierce, then via Creighton, Fairfax, Rosebud, Edgemont, then north through Hot Springs, Sylvan Lake, to Edgewood, and east through Rapid City to Pierre. Here make local inquiry as to a route to Gettysburg and Seneca. Next go to Huron, Iroquois, Lake Preston, then down to Sioux Falls, via the east side of the river, then south through Walthill, Oakland, Hooper, to Fremont.

Gardiner, Mont.—San Francisco

Gardiner, Mont.—Editor Motor Age—I am planning making a trip in October or November from Gardiner, Mont., to San Francisco and other California points via Ogden and Salt Lake City.

Kindly advise where I can secure road maps and routes between these two points.—J. J. Moore.

We would advise you to go via Yellowstone, then south through Ashton, St. Anthony, Idaho Falls, Pocatello, Dayton, Logan, Brigham, Ogden, then via Kaysville and Farmington to Salt Lake City. From here go via Grantsville, Wendover, Montello, then follow the northern route via Elko, Winnemucca, Lovelock, Wadsworth, Reno, Truckee, Alta, Sacramento to San Francisco.

Volume 5 of the Automobile Blue Book will give you complete running directions for this trip.

Chicago—Alexandria, Ind.

Chicago—Editor Motor Age—Kindly give the best route from Chicago to Alexandria, Ind.—L. Rathsack.

The best route for you to take between Chicago and Alexandria, Ind., is to go via Dyer, Valparaiso, then south to Tefft, east to Bass Lake, south to Logansport, then via Walton to Kokomo, south to Tipton, and east to Elwood and Alexandria.

Volume 4 of the Automobile Blue Book will give you complete running directions for this trip.

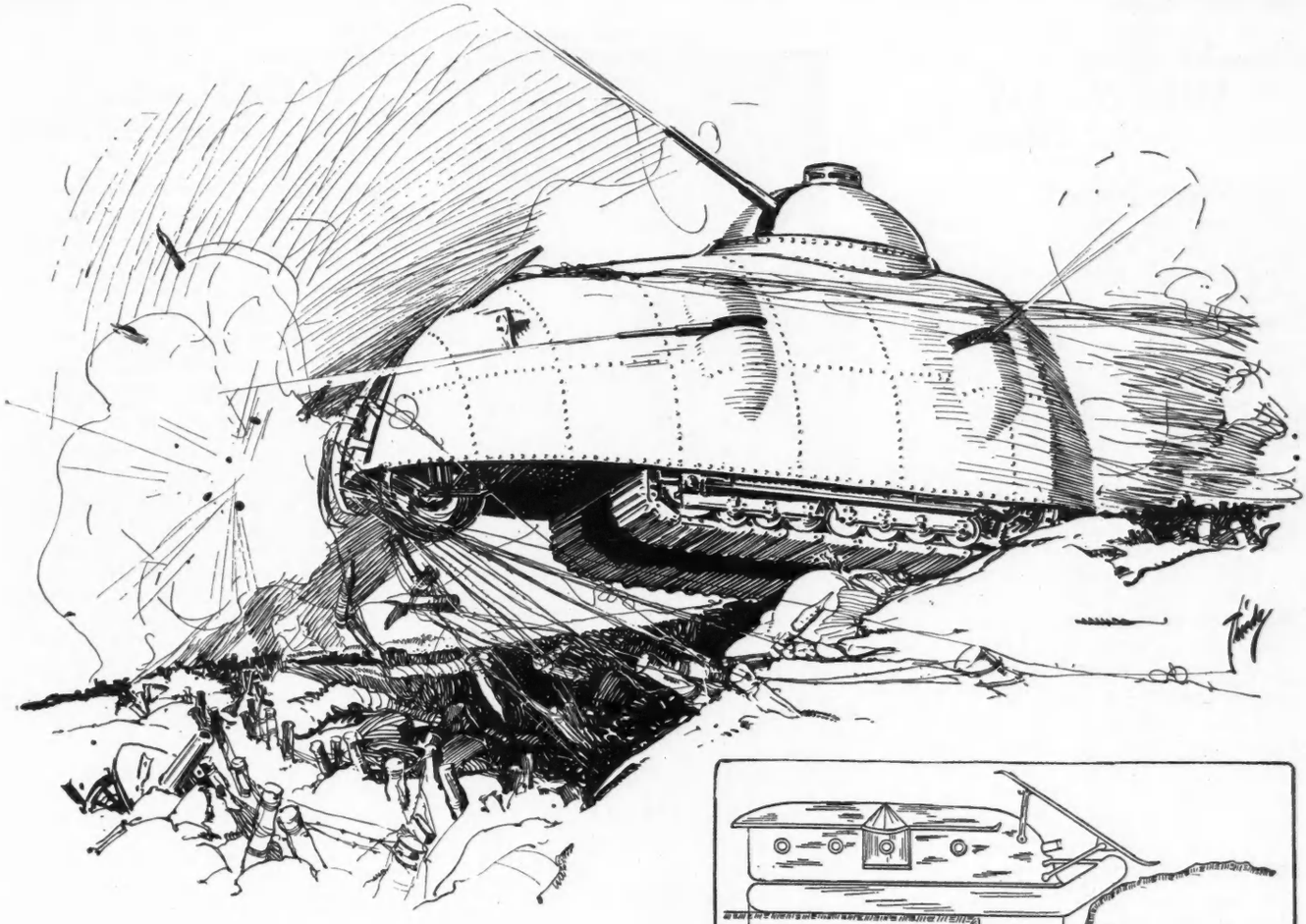
Salem, Ill.—Jacksonville, Fla.

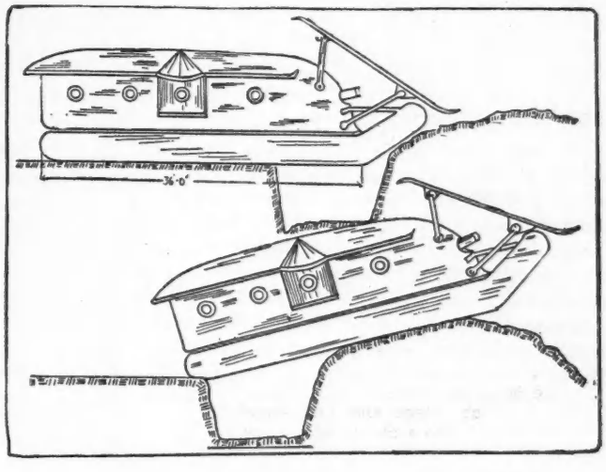
Salem, Ill.—Editor Motor Age—Kindly give the best route between Salem, Ill., and Jacksonville, Fla.—R. Martin.

In going from Salem, Ill., to Jacksonville, Fla., the best route for you to follow is to go via Olney, Lawrenceville, Vincennes, Washington, Shoals, Paoli, Fredericksburg, New Albany, to Louisville. Then from Louisville, drive through West Point, Elizabethtown, Cave City, Glasgow, Springfield, Nashville, Murfreesboro, Manchester, Tracy City, Chattanooga, Rossville, Dalton, Cartersville, Atlanta, Griffin, Barnesville, Macon, Perry, Hawkinsville, Waycross, Callahan, to Jacksonville.

Volumes 4 and 6 of the Automobile Blue Book will give you the complete routing for this trip.

His Majesty's Land Navy





In the absence of any definite details as to the exact construction and appearance of the new type of armored motor cars which have wrought such havoc on German trenches along the Somme, artists have let their imaginations run riot in depicting these mysterious land battleships. Above is the appearance of the British "tanks" as conceived by the artist Thiede; at the right is the drawing of Charles S. Weller, of Mitchell, S. D., who is another claimant of the honor of the invention.

THE mystery surrounding the details of design and construction of the new British armored motor cars, variously called "land battleships," "traveling forts," "superdreadnaughts of the field," "tanks" and many other expressive names, has given rise to rival claimants for the honor of their invention. One of these, a South Dakotan, claims to have replies from British official sources acknowledging the receipt of sketches and plans. His sketches, showing the operation of the caterpillar are reproduced at the right.

Imagine having a veritable traveling fort like that pictured in the larger view, rushing at you, its guns spouting fire and its operators concealed behind impregnable walls of steel! Such is one artist's idea of the tank in action. The drawing was made from data furnished by the Hyatt Roller Bearing Co., which furnishes bearings for the treads of the Holt caterpillar tractors, generally believed to be the basis of the British war cars.

British journals dispute the possibility of an American hand in the making of the cars by claiming all glory and honor for Britain's own factories. Most of the engineering works of England are said by London newspapers to have some share in the production of the cars. Secrecy attends the construction and parts are built in different factories and then assembled at a central factory under the supervision of experts from the armored-car division of the army.

Despite all mystery, however, the war cars are rapidly acquiring a reputation such as the artist pictures above, a kind of unearthly monster, met only in nightmares and the pages of fiction. It is pagan and hasn't even been christened, in spite of the great number of nicknames. Ensemble, it might bear the name of land navy with its companions, being a subject of England and all that. At any rate, the name of "Creme de Menthe," given it by a partial company of soldiers is not a suitable one. War car is much better, for its does suggest dragon fire at least, and that is what report would have believed.

From the Woman's Viewpoint

Does Motoring Make You Wild? Read This

SHE was sick and tired of coming home looking like a wild Comanche. What was the use of having a hairdresser and going to a whole lot of pains to get ready if the car could ruin it all, willy-nilly? Of course, the car didn't really do it, but there was bound to be some wind where there was motoring, and the worst of it was: She always thought she looked so much better than she really did, because her mirror showed smooth locks just before she started. The awakening on the return home to the mirror invariably shattered a fond delusion and proved the mirror a deceiver—in letting her believe she could remain unruffled.

So, she decided something must be done about it at once, or she would never step foot in a car again. She turned to the veil. Not the all-enveloping, disguising, would-be standard motor veil which makes some of us remind ourselves of skinned marmots and others of us feel like furniture in hot-weather hibernation. But the saucy, elusive, dainty veil which altogether misses conspicuousness and even brings with it better looks.

Fine Mesh Is Effective

Believe it or not, she said, the finest mesh is sufficient to hold unruly locks in check and to guard against the occasional dust that accompanies even the best boulevard. Oh, no, she did not mean to say that such a veil will protect against dust in clouds. It will not. Though, it does its best and keeps off some of the dust, which one would otherwise accumulate. But it does prevent the hair from getting snarled, if it is adjusted snugly so that it holds the hair as closely as a hair net would.

She was very careful in her selection of a veil, having once made up her mind to descend to one. She wanted a becoming veil while she was doing it. She studied her own particular needs through her mirror, an entirely satisfactory mirror in this respect. Color, shape of face, features; these were considered. And she discovered:

That a woman with a round face wears the figured veil more easily than the slimmer-faced woman can, for if your face is slender and your features are clear cut, you need to avoid the veil with large figures and coarse mesh, and just as you dress your hair high to accentuate a slim face and broadly when your face is round, veils should follow the lead of the shape of the face and fit the wearer.

That a face with a high color bears the heavier and more pronounced veil better than do delicate faces, which should have veils of the finer mesh, though even then, the flesh tint can add to the general effect by giving a touch of color to the pale skin.

That, in short, the strength of the features can be pronounced by the selection of the veil to be worn, this being the reason why so many think the use of a veil makes the wearer seem better looking.

Motor veils are a matter of choice of many styles; fancy, Modette, hexagon, hairline, bordered, lattice, square, craquele, Pom Pom, Winta-White
Veils from E. & Z. Van Raalte, New York

Every Car Has Its Drawback of Windy Locks

Veil for Every Choice

The veils shown in these illustrations show the opportunity for choice which awaits the woman who seeks a veil. The plain mesh is made to soften the features and not only feels soft, but comfortable to the face. The woman who wears her veil to the chin only can find several fancy borders. The woman who thinks herself too sedate for the novelty of square veil or chin veil can turn to the assortment of bordered hexagon veils. These veils have narrow and wide designs and come in different styles of mesh.

The two large veils offer variety. The

Pom Pom has the elastic center. The square veil is adjusted by draping over the crown of the hat. All the veils shown here are made by E. & Z. Van Raalte in New York. They can be obtained from local dealers, however. All except those with applique or embroidery can be washed. The veiling can be bought by the yard for from 25 cents to $1 a yard. The Pom Pom and square veils come in different patterns for from $1 to $5 a veil.

Veils Are Worn So

There is an art in adjusting a face veil just as there is an art in designing one. The first consideration is that of wrinkles. No woman likes wrinkles, in her face or in her veil, and part of the purpose of the care used in adjusting the veil is to eliminate wrinkles.

Shaking the veil before putting it on does wonders. The corners should be held to straighten the veil out; a little shaking helps matters. Draw the veil back closely around the face and brim of the hat; not closely enough to twist any figures the mesh may contain, but closely enough to avoid superfluous folds.

Either tie the veil in a tight knot at the back or pin it securely so that the pin does not show. If you have used care in placing the veil about your face, the ends at the back will be of almost equal length. Tuck these in carefully. They are very easy to tear and hard to handle when torn.

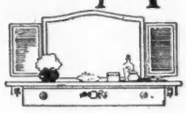
If you are using the elastic center veil you will find much of the trouble of adjustment eliminated. This veil may be adjusted on the hat while it is off and need not be removed from the hat.

A new fad, that is, new in its being vogue just now, is that of using veil for both hair net and face veil. The hexagon or hairline mesh is the one usually selected. It is adjusted over the face and hair before the hat is put on. In this way, the hat is kept in place and the veil looks just as well as if it had been adjusted on the hat.

If your veil has a figure of some kind in its mesh, this will bring on more care. It would never do to have some unnatural figure from the fertile brain of a designer prance jauntily across your eye at the opportune moment for seeing where you are going. Neither would it do to have a heavy embroidery butterfly give your mouth that lopsided effect that goes so illy with your intentions. Veils are designed with the proper placing of figures in mind, so that the figures will fall correctly on most faces. The eyes of the wearer are also of thought, so that clear vision may not be obstructed by the wearing of the veil.

For your own case you must be the diagnostician. Study the position in which your veil looks most becoming by adjusting it in various positions while before the mirror. Have your features clear of any noticeable designs, and you will have solved most of the problem.

Beauty Hints for the Woman Motorist



No. 8

BRUSHING the hair has its advocates and its opponents. After a long motor journey it is almost absolutely necessary, unless one can rush immediately to a hairdresser. Some urge that brushing the hair only distributes the oil and makes the dust and grime stick that much closer. It is true the hundred strokes each night belong to grandmother's days, but modified strokes are still in order.

If you do brush your hair, it should be done by degrees. Part the hair in the center, from the forehead to the base of the neck, separate it into small strands and brush each strand thoroughly from the roots to the end with long, straight strokes. Do not use the bristles flat on the head. This is irritating to the scalp, especially on a warm day. The pores of the scalp are open just as those of the face are, and the sharp bristles may inflame them if allowed to touch the scalp. In that case, the new and tender hair is broken or bruised. Turn the brush sideways, and the bristles will stroke the hair only, and not the scalp.

If your hair is naturally oily and the brushing seems to aggravate this condition, orris powder used afterward will make the hair as fluffy as when shampooed. It is inadvisable to use talcum, as so many do, to make the hair fluffy. The talcum sticks and clings to the scalp, besides remaining in the strands of hair and giving a grayish cast to the hair. Talcum cleans the hair temporarily, but its ill effects overbalance any good effects. Its continued use will make the hair break.

Cornmeal also is used to clean the hair and to make it fluffy. While much easier to remove than talcum, it is still difficult to do so. For those who cannot obtain a shampooer often, or who may be entirely out of reach of such, this is a simple, efficient means of dry-cleaning the hair.

By no means neglect the sunbath for the hair. But the sunbath must be controlled. Its use is good occasionally only, and when the hair is down, for a sunbath taken when the hair is dressed results in an uneven effect and the end of the season will find the hair streaked and brittle. A bareheaded habit is also likely to result thus. Light hair needs more protection even than dark, for the sun's rays more quickly affect the hair in which there is little pigment coloring.

If you enjoy going bareheaded, choose the early morning or late evening in which to do so. If you think brushing is necessary for a good suit of hair, be careful not to irritate the scalp. Misuse can destroy the good effects of any method which is, on the face of it, highly recommendable.

They Take Care, Too

Veils pick up the dust and grime, dainty as they are. To keep them dainty they must have care. The first rudiments of the care are: Never roll your veil and do not rumple it.

If you have a large piece of cardboard on which to spread your veil out flat, well and best. If you must fold it, first spread it out flat and then fold carefully, making as few folds as possible.

Your veil box should be as important as your glove box. A woman should have as many veils as gloves, in the first place. For veils, to remain dainty and fresh, must have rest and care; they are delicate, you know, having little strength in the mere strands of fine silk of which they are made.

The wind fills your veil full of dust. The veil keeps most of this dust from touching you. The veil should be shaken gently and brushed, unless there are fragile dots or figures which might be harmed. Most veils, except those embroidered or velvet dotted, can be washed. This is a great advantage, because everyone knows how disagreeable it is to wear a dusty veil, and all veils become soiled by the atmosphere as well as by handling.

To wash a veil, use lukewarm water and castile soap—Ivory soap is good—and move the veil about in it. The veil cannot bear rubbing; soapy water is enough anyway. Rinse in several bowls of lukewarm water and press the veil gently between the hands. Do not wring it or squeeze it hard. Dry the veil by laying it out flat. If you hang it up, be sure to fasten the upper edge at several points or it will pull out of place.

THE SIMPLE MOTOR LUNCH

Stuffed Tomatoes Chicken Jelly Salad

Olives Graham Sandwiches

Cold Tongue

Macaroons Fruit

Now that autumn is beginning to crisp the air, camp fires and warm lunches by the roadside attract the motorist. But for fear someone may be contemplating trips which permit no luxury of fire and cooking by the way here is another simple lunch that can be obtained quickly, from a delicatessen shop, for instance. Tomatoes may be scarce in some regions at this time, but otherwise this is what its name signifies—a simple motor lunch.

The Readers' Clearing House

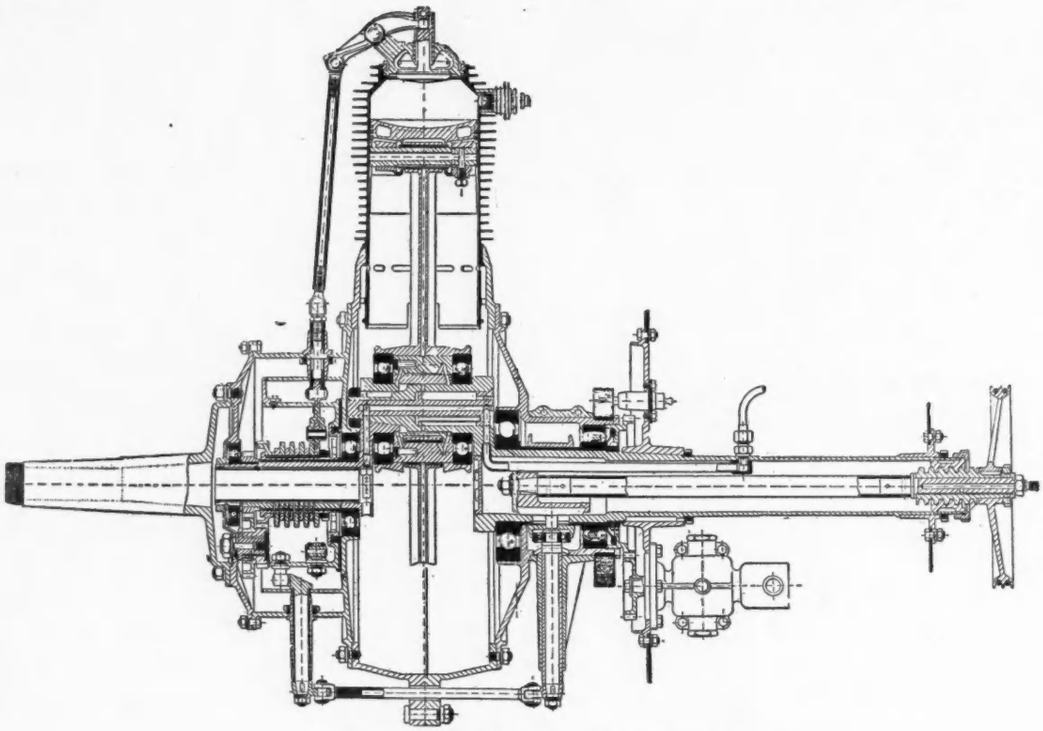


Fig. 1—Sectional view of latest Gnome motor

Description of Mono-Soupape Gnome Motor

KANSAS CITY, Mo.—Editor Motor Age—Please explain or give drawing of the Gnome rotary motor.

2—Are the cylinders on the Panhard-Levassor Knight motor the same distance apart, and how many bearings have they?

3—Give valve timing in degrees of same.

4—Please explain the single sleeve valve Knight first invented.—A. B. Bruce.

A new Gnome which is about the latest of this type to be built is known as the mono-soupape or single valve engine. A front view of the motor is shown in Fig. 2 and a cross section in Fig. 1. As can be seen in the latter, the cylinders are extended for some distance into the crankcase which is filled with a very rich fuel mixture, and through these extensions ports are cut at such positions that they are uncovered by the pistons toward the end of the power and suction strokes. The exhaust valve opens sufficiently early on the power stroke to allow the gas pressure to drop near to that of the atmosphere before the intake ports are uncovered, so that there will be little tendency for any gas to pass in either direction through the ports at the end of this stroke. The gas mixture in the crankcase is so rich that there is no chance of backfire. On the suction stroke the exhaust valve remains open long enough for the cylinder to be nearly filled with fresh air. The valve is closed in time to cause the pressure to drop below atmospheric and draw in a charge of the rich gas when the intake ports are uncovered. This charge mixes with the pure air already in the cylinder, forming a combustible mixture, which is compressed and ignited as usual. It should be noted that the use of a muffler is impossible. Lubrication is force feed throughout.

2—In the new aluminum motor job of the Panhard-Levassor the cylinders are the same distance apart and there are seven crankshaft bearings.

3—This information is not available.

4—The original patents of the Knight motor covered an air-cooled proposition in which the air-cooled cylinder wall served the same purpose as the outer sleeve does in the present Knight motor. The basic principles of operation of the old motor and the new are the same. However, the original had nothing which corresponds to the present cylinder wall. The cylinder wall itself reciprocated.

TO CONNECT KLAXON ON DODGE

Reader Answers Inquiry of C. W. Havemeyer of Cincinnati

Athens, Ga.—Editor Motor Age—Noting a communication from Mr. C. W. Havemeyer, Cincinnati, Ohio, in regard to connecting a Klaxon horn on a Dodge car: I connected a six-volt Sparton horn on my Dodge car, in a very simple manner, by removing the wire from the switch or ammeter under the dash and connecting it direct with storage battery at an exact center of the storage battery on the lead connection between the third and fourth post, at point which is the most accessible. This has given good service and have been assured by a considered expert electrician, the voltage, by this connection, has been reduced to 6 volts. I would like to have Motor Age's idea about this connection, if you approve of it. Not having an ammeter am in no position to know how much current is really used by the horn when in use.—Sol J. Boley.

That connection is proper.

FORMULA AND BRAKE HORSEPOWER

Explanation of N. A. C. C. Rating and Dynamometer Brake Tests

Peru, Ill.—Editor Motor Age—Explain how many ratings of horsepower there are and which is usually used by the car makers and dealers and how does it differ from the S. A. E. horsepower rating.

2—Does the stroke of a cylinder add any to the power, or is it the bore alone? Is the Ford 22 horsepower, and what rating?

3—Is the Elcar identical with the Elkhart?

4—Where is it sold?—C. Storek.

1—In this country there are two forms of horsepower rating used. One is a formula rating. That is a motor with a 3-inch bore and four cylinders has exactly the same horsepower as any other motor with 3-inch bore and four cylinders, regardless of motor design. This is the N. A.

C. C. horsepower rating, sometimes spoken of as the S. A. E. rating. It is: diameter times diameter times number of cylinders divided by 2.5 equals horsepower. The other rating is what is known as brake horsepower. This is calculated by attaching the motor to a dynamometer which is an instrument which measures the resistance the motor is capable of overcoming at various speeds in terms of horsepower. For instance such-and-such a car is said to develop 38 horsepower at 2,000 revolutions per minute.

2—In formula rating the stroke does not effect the horsepower. In brake tests, however, in two motors with the same bore, the one with the longer stroke has greater power because the piston displacement is greater, thus the volumetric efficiency is increased. The Ford is 22 horsepower, N. A. C. C. rating. 3—The Elkhart is the predecessor of the Elcar. It is made in Elkhart, Ind., by the Elkhart Carriage and Motor Car Co.

Wants 2 to 1 Gear

Grumville, O.—Editor Motor Age—Give me the addresses of two or more companies who will make me gears with a gear ratio of 2 to 1 on high.

2—Where could I purchase an axle with this ratio?

3—What is the address of the Standard Roller Bearing Co.? Is this the company that makes Rudge Whitworth wire wheels?—A Subscriber.

1—You do not state the make of car which you have. Possibly you can procure such a ratio from the makers. In the advertisers' clearing house columns of this issue you will find the names of concerns which specialize in such jobs.

2—Again, you do not give us the make of car.

3—Standard Roller Bearing Co., 50th St. and Lancaster avenue, Philadelphia. This company handles the Rudge-Whitworth business in this country.

HOW TO RECHARGE WET BATTERY

Directions Given for Mixing Electrolyte and Preparing for Charge

Hinton, Okla.—Editor Motor Age—Could Motor Age please tell me how to recharge a four-cell stone jar Edison battery of the liquid type? We have a set of them and they need refilling, but I don't know the exact proportion of the chemicals to be used, so I wish you would print a formula in your next issue of Motor Age.—Henry G. Buschman.

It is strongly advisable to obtain the electrolyte ready diluted, from the makers; but if you cannot do this proceed as follows:

A large lead-lined box of sufficient capacity to fill all the cells should be about three-quarters filled with water. It is very important to use distilled water and not water from the tap, as the slight impurities in the latter, particularly traces of lime, have a very detrimental action on the plates. Accumulator acid, which is the best brimstone sulphuric acid you can buy of about 1.84 specific gravity, is now slowly poured into the water, care being taken to keep your face and hands well out of the way in case of splashes. The acid should, on no account, be poured from an earthenware jug filled as required from the bottle of whatever kind of a container the acid came in. This must be done very carefully and slowly, and the pouring, into the water, should be stopped every few seconds for a minute or so to prevent too violent a chemical action taking place. When acid has been thus added to the extent of about a fifth of the bulk of the water, the mixture should be thoroughly stirred with a wooden rod and allowed to cool. The chemical action of the water mixing with the acid generates considerable heat.

When quite cool test the specific gravity with a hydrometer, and add more water or acid as may be required, to obtain the correct density. This varies with the make of cell between 1.180 and 1.215. To obtain a correct mixture the liquid must always be allowed to cool after adding more acid. After the acid is mixed it should be allowed to stand for several hours before putting into the cells, and should be stirred once in a while.

During these operations rubber gloves should be worn, and it is advisable to rinse them occasionally. You can not be too careful of the acid.

In filling the jars the polarity should be tested and if connected up correctly the cells may now be filled. This should be done as quickly as possible by ladling the acid from the mixture, or drawing it out with a syringe. Fill the cells so the tops of the plates are thoroughly covered by the water.

It is most important that charging be commenced as soon as the cells are filled, otherwise the plates will sulphate.

TIMING TWO-CYCLE ELMORE MOTOR

Gas Distributer and Atwater-Kent Only Parts to Be Adjusted

LeRoy, Ill.—Editor Motor Age—Give instructions showing how to time a two-cycle Elmore motor.—C. D. Jones.

There are only two parts in an Elmore that it is necessary to time, the gas distributer that admits the gas into the pump chamber, and the device for making the electric spark. There are two ways of knowing whether the gas distributer is properly timed. You will find an arrow and a set screw; the arrow stamped on the end of the distributer shaft and the set screw holding the fan pulley onto the main engine shaft. Both should point in exactly the same direction. The other way, or confirmation of the one, is to have the set screw point straight down. The second port of the distributer which controls the gas entering the pump chamber of the first cylinder is entirely open. In making this test you must invariably have the distributer set in the advanced position. It is necessary to remove No. 1 cylinder, the one nearest the radiator, in order to observe the port openings.

For setting the Atwater-Kent spark timer, the set screw holding the fan pulley should be directly on top of the shaft. With the spark lever on the steering wheel retarded as far as it will go, the No. 1 blade on the vertical shaft inside the Atwater-Kent and which controls the spark in No. 1 cylinder, should just be making contact. We call your attention, however, to the fact that these blades and poles do not actually come into rubbing contact, there being a very slight gap.

WANTS RACING BODY ON FLANDERS

Motor Age Has Never Heard of Witt Special—Want More Details

Bellaire, O.—Editor Motor Age—I have a Flanders car fitted with model R Schebler carbureter. The motor runs well and does about 40 to 45 miles an hour. Kindly give me a racing body design suitable for this car. It is a roadster, known as the Witt Special, with 32 by 3-inch wheels. Would 30 by 3-inch tires be suitable?

2—Where can one procure wire wheels?—Lou Curtis.

1—We have never heard of a Flanders known as the Witt special and, inasmuch as you probably have a car equipped with a special body, we would suggest that you furnish us with a photograph so that we may use it as a basis for drawing up a plan for a speedster body. You ask if 30 by 3 tires would be suitable in place of 32 by 3. You do not, however, state why you want to make the change. There would be no particular advantage in the smaller tire unless you figure in the slight difference in price, which, at that, would probably be compensated by the faster wear of the small tire.

2—Among the wire wheel makers in this country are: Craftsmen Motor Corp., 2815

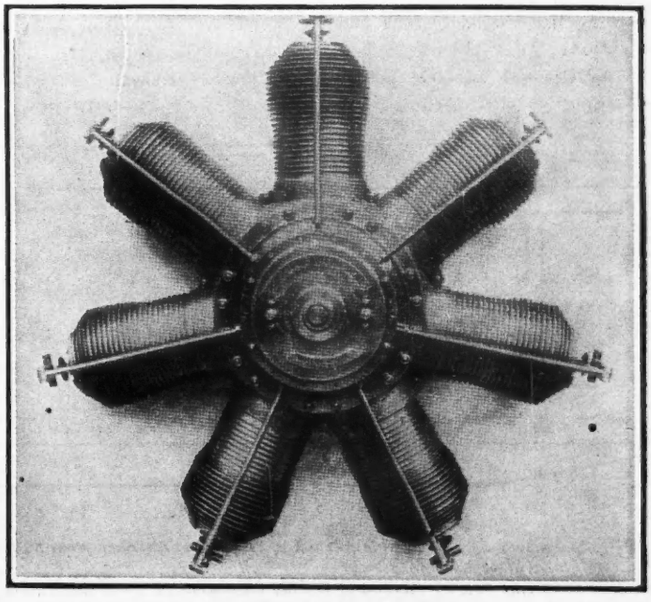


Fig. 2—Front view of Gnome single-valve motor for aeroplanes

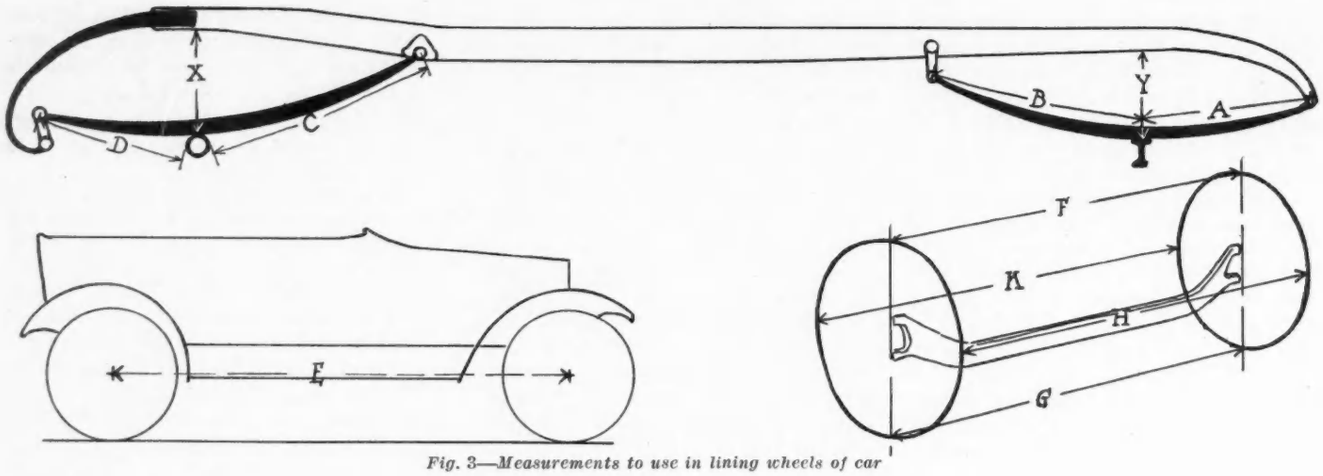


Fig. 3—Measurements to use in lining wheels of car

S. Wabash Ave., Chicago; F. & H. Wire Wheel Co., Springfield, O.; General Rim Co., St. Marys, Pa.; Great Western Mfg. Co., Laporte, Ind.; Houk Mfg. Co., 1700 Elmwood Ave., Buffalo, N. Y.; Hayes Wheel Co., Jackson, Mich.; Mott Wheel Wks., Utica, N. Y.; Standard Roller Bearing Co., Philadelphia; Standard Welding Co., Cleveland; Universal Welding Co., St. Anne, Ill.; Whiteside Wheel Co., Indianapolis.

INCREASING GENERATOR CURRENT

Cannot Change Put-In, But Current Supply Can Be Raised

Mayesville, S. C.—Editor Motor Age—The chain-drive genemotor starter on my Ford does not keep the battery fully charged. The battery is O. K., but stays down because I make so many stops and the runs around town are short. Can the genemotor be made to cut in at a lower speed, or what do I need to do to the outfit to make it charge the battery under the conditions above? The genemotor cuts in at 10 miles per hour about 5 amperes and at 20 miles per hour 15 amperes, which seems sufficient, but the battery is constantly below 1.250. Generator and battery are both clean and in good condition.—H. C. Bland.

You can hardly change the put-in point of the genemotor. You can, however, easily increase the charging current and this should be done by all means if you are making the frequent stops and starts you mention.

The General Electric people state the charging current "can be increased by shifting the position of the brush, by removing the cover on the commutator end of the machine, and loosening up the screws holding the brush holder yoke with brushes in position. This being done, lightly tap the brushes about $\frac{1}{16}$ inch to $\frac{1}{8}$ inch forward in direction of rotation. This will probably bring the charging current up to about 10 amperes, at 10 miles per hour and all of 20 amperes at 20 miles per hour. In moving the brushes it is merely necessary to see that commutation is not affected. Much beyond $\frac{1}{8}$ inch is apt to affect commutation. The increased charging current will probably necessitate little closer attention to the battery and you should be sure that it is kept well filled, particularly so in the case of long runs."

Tire Sizes on Ford

Wanamingo, Minn.—Editor Motor Age—I have a 1917 Ford roadster which when new was equipped with 30x3½ Goodrich nonskid in rear and 30x3 plain in front. Now I didn't want to carry two sizes inner tubes and casings, so I had 30x3 Goodrich Nonskid placed on it all around. As the car is a roadster I figured it would be all right with 30x3 tires. Does Motor Age think they are large enough? Seems to me they are. A five-passenger Ford would have about 600 pounds extra weight when figuring weight of rear end, and three passengers.—H. Romness.

1—Although 30 by 3 tires are large enough to carry the load, 30 by 3½ is a better size. The large tire gives greater mileage in comparison with the initial cost and certainly makes a noticeable difference in the riding qualities of the car.

REASON FOR RIVETS IN WHEELS

Bolts Are There to Hold Spokes From Twisting Out of Place

Falls City, Neb.—Editor Motor Age—Explain the function of the belts of rivets in the rear wheels of some cars. In some there is a bolt in every spoke and in others one in every other spoke and others there is none at all.

2—When will you have a description of the 1917 Cadillac in Motor Age?

3—Please publish a picture or diagram of the Packard aviation motor with description. Who uses this motor?

4—Please publish a description and diagram of the Emerson four.

5—Will the use of water vapors in the combustion chamber have any bad effects on the cylinder walls.—Thurmond Mudd.

The rivets are there to hold the spokes in place. In types where bolts are not visible the spokes are locked by internal bolts or pins.

2—This was described and illustrated in the August 24 issue of Motor Age.

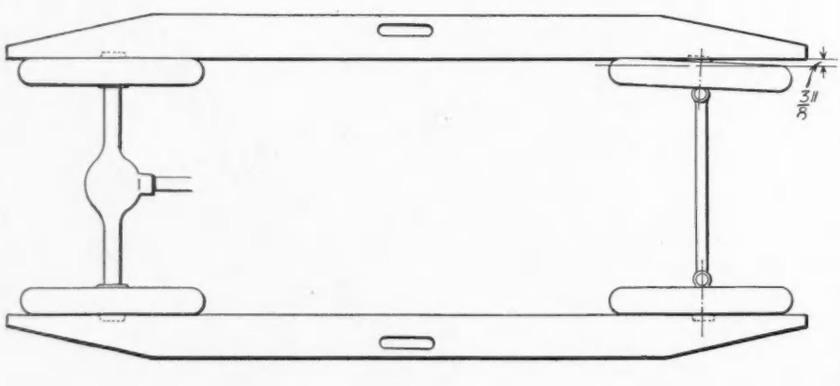
3—This was described in the May 4 issue of Motor Age. No one is using it other than Packard and they have not yet marketed it. What motors have been built are being used for experimental purposes only.

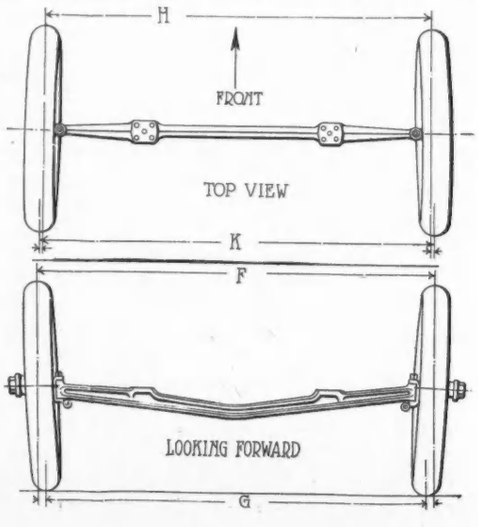
4—We have no data on the Emerson.

5—No.

Two-Story Garage Plan

Vandalia, Ill.—Editor Motor Age—We are contemplating erecting a garage, two stories with basement 60x150 feet. Please advise if you could





Above Fig. 4—Simple method of measuring distance from hub to hub with a straight edge
Right Fig. 5—Method of testing alignment of the front wheels

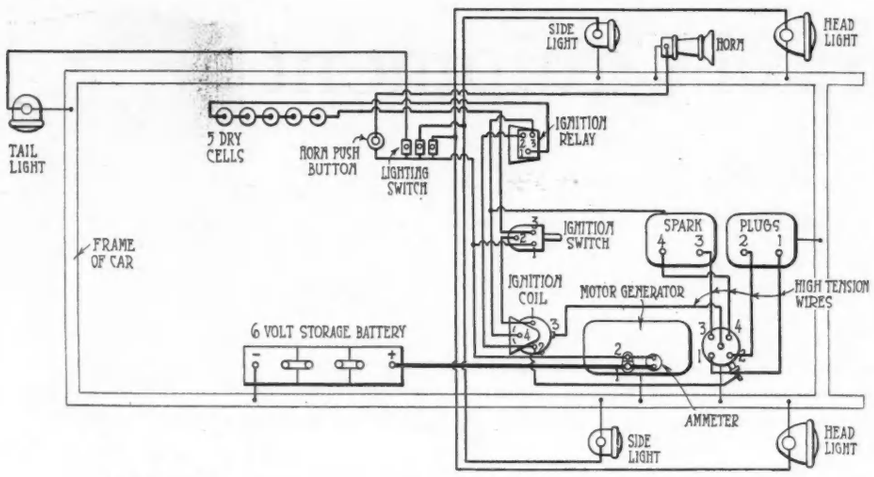


Fig. 6—Wiring diagram of Buick B-24 showing method of attaching ammeter

give us any information on this as to plans. Should it be that you cannot, please advise us where we could get same.—C. A. Evans.

If you will advise us whether the garage is to be located on a corner or in the middle of the block with or without an alley behind and what kind of work you contemplate doing; that is if you will have a tire repair department, sales room, accessory department, etc., Motor Age will gladly prepare plans for you and print them in the Readers' Clearing House department.

INSTALLING AMMETER ON BUICK

Wire Diagram and Explanation Covering Models B-24-25

Caledonia, Minn.—Editor Motor Age—Kindly explain and illustrate the method of connecting an ammeter on a 1914 Buick using the Delco Junior system.—M. L. Rolfing.

We are publishing a wiring diagram covering the 1914 Buick models B-24-25. To install an ammeter, first cut the brass strap between the motor terminal No. 1 on the generator and the generator terminal No. 2. On the first models this is a rather difficult matter as the strap is on the inside of the generator. In these the generators must be torn down. On the later models, however, it is a simple matter. Attach a No. 10 red wire from the motor terminal No. 1 to one post of the ammeter and another wire from the generator terminal No. 2 to the other post of the ammeter. If, after you have made the installation, you find that the ammeter shows discharge when it should show charge and vice versa, change the wires on the ammeter posts, one for the other.

WIRING OF JESCO ON THE KEETON

What Causes Noise in Push Rods of Old Rutenber Motor?

Los Angeles, Cal.—Editor Motor Age—Show internal wiring diagram of controller and motor generator of Jesco system put out by Jones Electric Starter Co., and formerly used on Keeton and Cartercars.

2—What make, size and length resistance wire is used across the regulator points of the field circuit on the Keeton car?

3—Is there any way to reduce or remove the noise in a 1909 Rutenber 40-horsepower engine caused by the valve lifting mechanism operating on the camshaft?—H. L. Bush.

1—The wiring diagram will be found in Fig. 7.

2—The Carnation Motor Car Co., Detroit, handle spare parts for the Keeton car and can undoubtedly furnish you with information concerning the proper size of wire.

3—What causes the noise? Are the valves improperly adjusted? Is the valve actuating mechanism worn so that it is loose? If the latter is the case you can replace the worn parts with new ones and get rid of the noise.

Communications Received and Inquiries Answered

A. B. Bruce	Kansas City, Mo.
C. Storek	Peru, Ill.
A Subscriber	Grumville, O.
Sol J. Boley	Athens, Ga.
Henry G. Buschman	Hinton, Okla.
C. D. Jones	Leroy, Ill.
Lou Curtiss	Bellaire, O.
H. Romness	Wanamingo, Minn.
H. C. Bland	Mayesville, S. C.
Thurmond Mudd	Falls City, Neb.
C. A. Evans	Vandalia, Ill.
R. F. Morse	Ludington, La.
L. U. Pitts	Memphis, Tenn.
Allan Reid, Jr.	Owensboro, Ky.
Brooks Corson	Portland, Ark.
M. L. Rolfing	Caledonia, Minn.
H. L. Bush	Los Angeles, Cal.

No communication not signed by the inquirer's full name and address will be answered in this department.

EASY METHOD OF LINING WHEELS

One System Will Apply on Practically All Makes of Cars

Memphis, Tenn.—Editor Motor Age—Advise how I can line up the rear wheels with the front on my Velie roadster 1912 model.—L. U. Pitts.

The diagram in Figs. 3, 4 and 5 illustrate the general scheme which is followed in lining up the front wheels at many of the motor car factories. You should allow for camber of about 5 degrees. The wheels should toe in about ⅜ inch. In Fig. 3 all the lettered distances should be measured in duplicate. That is, the distance A from the frame end to the front axle should be the same for the right front spring as for the left front spring. These should be measured with a stiff straight-edge of some sort—not a tape. The distance E is the most important measurement. The sketch in Fig. 5 is to test the alignment of the front wheels. Distances F, G, H and K are measured from the center of the tread. H should not be greater than K and not more than ¾ inch less. G should not be greater than F and not more than ¾ inch less. In Fig. 4 is shown a method to measure the distance from hub to hub with a straight-edge.

COMPRESSION IN POUNDS OF CASE

Figures on Pounds per Square Inch Pressure Exerted By Gas Explosion

Owensboro, Ky.—Editor Motor Age—What is the compression of the Case 40, 1916 motor, in pounds per square inch?

2—How many pounds per square inch pressure is exerted in the Case 40 by the explosion under full throttle?

3—How many pounds is exerted in about the average motor?

4—What is the actual brake horsepower of the Pierce-Arrow 60.—Allan Reid, Jr.

1—The compression of the 1916 motor is from 70 to 73 pounds gauge.

2—The normal explosion pressure will range from 250 to 270 pounds per square inch with maximum pressures running up to 350 pounds.

3—The Case is a medium compression motor and the above figures can be considered about average.

4—If you are referring to the 60-horsepower 1909 car, which was the only Pierce designated by that figure, the actual brake horsepower, according to the factory, is 60 at 1,000 revolutions per minute. It is possible that you may be referring to the 66-horsepower 1916 model. This gives 88 brake horsepower at 1,000 revolutions per minute.

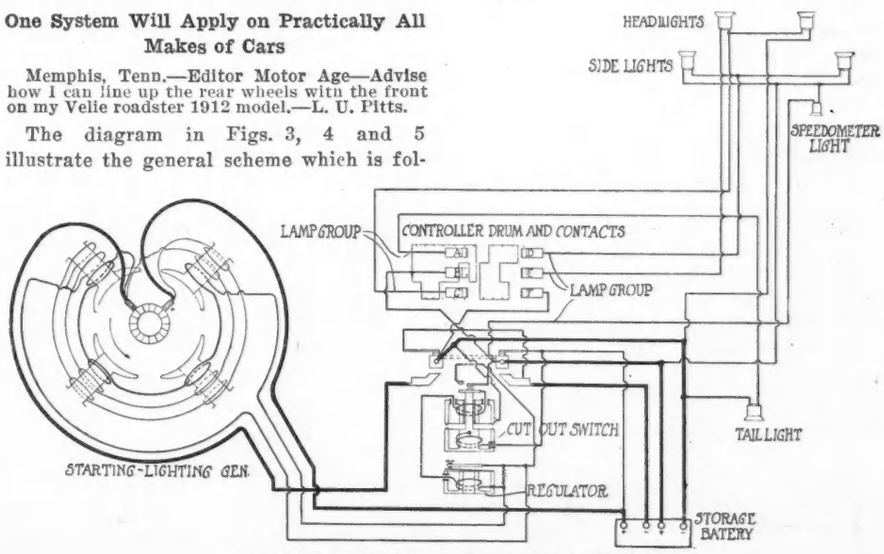
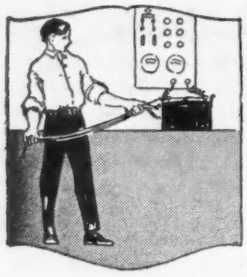


Fig. 7—Jesco wiring system as used on Keeton



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the thirteenth installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells were taken up and the best methods of connecting them. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and electro-magnetism then were considered and the principles of generators and motors explained.

Part XV—Generator Armatures

THE operation of the generator having two loops of wire and four segments in the commutator, as shown in Fig. 107, is not altogether satisfactory, as each loop is connected to the external circuit only while the brushes are in contact with the segments of the commutator, to which the terminals of the loop are connected. An armature winding of this type is called an *open-circuit winding.*

A better form of winding for direct-current dynamos, called a *closed-circuit winding,* makes use of all of the loops of wire all of the time except when the two commutator segments to which a loop is connected are in contact with a brush or brushes of the same polarity. One of the simplest forms of closed-circuit winding is shown in Fig. 109, which consists of a wire ring with four coils wound about it and interconnected by means of four commutator segments as shown in the figure. For convenience in referring to these coils they are designated as A, B, C and D. The two coils A and B are short-circuited by the two brushes when they are in the position shown in the figure. An instant later, however, coil A is in series with coil B on the right side and coil C is in series with coil D on the left side, and this connection remains until coils B and D are short-circuited by the brushes. An instant later, coil D is in series with coil A on the right side and coil B is in series with coil C on the left side.

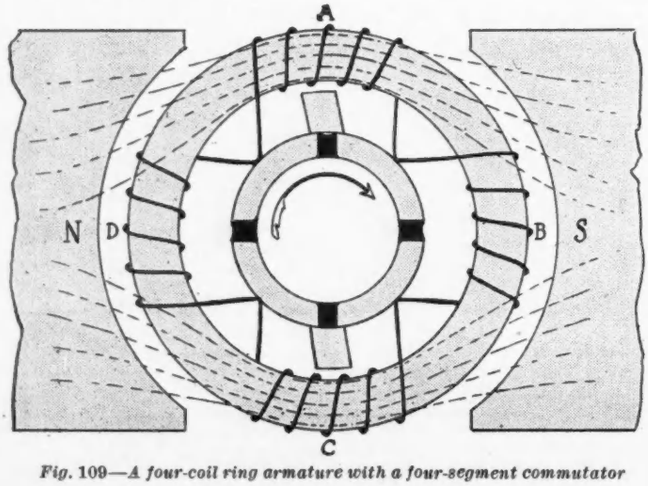


Fig. 109—A four-coil ring armature with a four-segment commutator

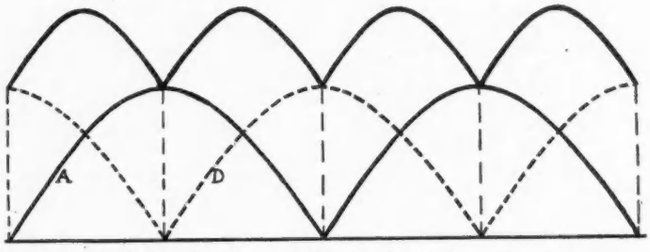


Fig. 110—Curve showing variation of electrical pressure between the terminals of a four-coil ring armature with a four-segment commutator

It is apparent that the coils opposite each other are short-circuited by the brushes at the same time when they are symmetrically arranged, as in this case, and as one coil leaves the right circuit and enters the left circuit at the lower brush, while there is a coil leaving the left circuit and entering the right circuit at the upper brush. With this arrangement of commutator segments and coils, all of the coils are in circuit with the external circuit all of the time, except when they are short-circuited by the brushes. If the position of the brushes on the commutator is such that the coils are moving parallel to the magnetic field when the coils are short-circuited, there will be no electrical pressure induced in the coils and, as a result, the electrical pressure between the brushes is not decreased by short-circuiting the coils.

The electrical pressure in all of the coils on the right side of a vertical line through the brushes will be in the opposite direction to the electrical pressure in the coils on the left side of the vertical line through the brushes. The electrical pressures in the coils on the right and left sides of the vertical line act oppositely to each other, just as the electrical pressures of two batteries connected in parallel act opposite with respect to each other, but they act in the same direction with respect to the external circuit.

The movement of the coils across the magnetic field just before they are short-circuited is in the opposite direction to their movement across the magnetic field after they have been short-circuited. This results in the electrical pressure induced in the coils before they are short-circuited acting around the coil in the opposite direction to that in which the electrical pressure induced in the coil after it has been short-circuited acts. In other words, the electrical

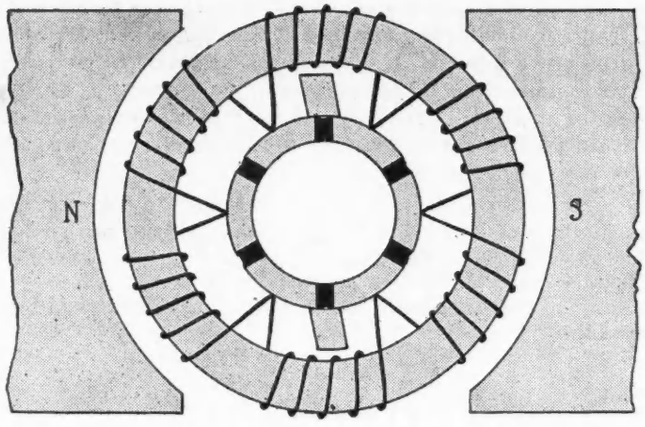


Fig. 111—A six-coil ring armature with a six-segment commutator

pressure induced in the coil reverses in direction while the coil is short-circuited.

The total electrical pressure between the brushes at any instant will be equal to the sum of the electrical pressures induced in the coils connected in series between the brushes. When the coils are symmetrically placed, as shown in Fig. 109, the variation in the electrical pressure between the brushes will correspond to the variation in the total pressure of the coils connected in series between the brushes. Thus the electrical pressure induced in the coil A with respect to the external circuit may be represented by a curve similar to the one marked A in Fig. 110. Both parts of the curve are drawn above the horizontal line, as the connection of the coil with respect to the external circuit changes when the coil passes the position of short-circuit or the position where the induced electrical pressure reverses in direction. The electrical pressure induced in the coil D with respect to the external circuit may be represented by a second curve D. The electrical pressure in A is a maximum when the electrical pressure in D is zero and the electrical pressure in D is a maximum when the electrical pressure in A is zero. The electrical pressure between the brushes at any instant will be equal to the sum of the pressures induced in the two coils connected in series at that instant, and it may be represented by a third curve whose height above the horizontal is equal to the sum of the height of the two curves A and D. This third curve is shown heavy. From an inspection of Fig. 110, it is seen that there are four loops to the shaded curve and that the pressure fluctuates in value. By increasing the number of coils on the ring and the segments in the commutator, the number of fluctuations in the pressure between the brushes for one revolution will be increased and the variation in the pressure decreased. A six-coil armature and six-segment commutator are shown in Fig. 111. The electrical pressure between brushes for such a combination of coils is shown by the shaded curve in Fig. 112. The height of this shaded curve is equal to the sum of the heights of the three other curves.

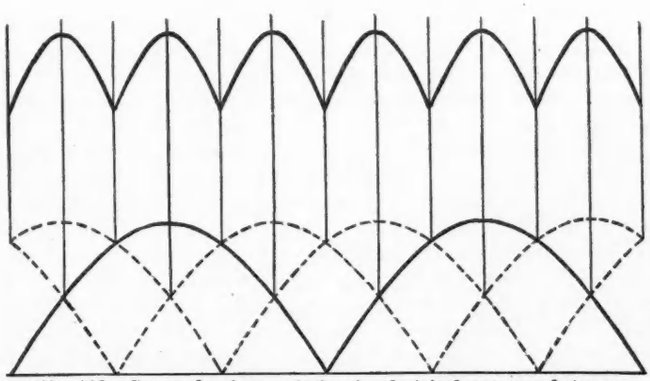


Fig. 112—Curve showing variation in electrical pressure between the terminals of a six-coil ring armature with a six-segment commutator

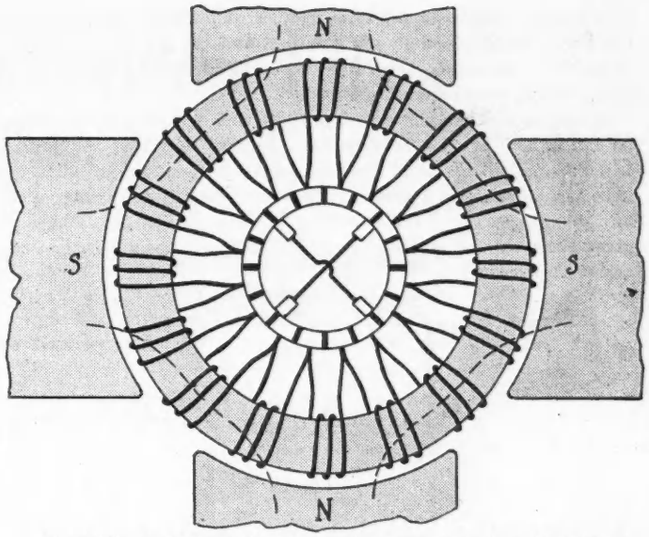


Fig. 113—A sixteen-coil ring armature operating in a four-pole magnetic field

Multipolar Ring Armature

The armature of a generator may be revolved in a magnetic field of more than two poles, providing the connections of the various coils and the position of the brushes are properly made. For example, a four-pole armature is shown in Fig. 113. Four brushes are used and alternate ones are of the same polarity and connected together. The brushes are shown inside the commutator; they are in reality, however, outside. In passing from the negative terminal of such a winding through the winding to the positive terminal there are four possible paths. If this were a six-pole armature there would be six paths and so on. There are types of windings, however, in which the number of paths through the winding may be greater than the number of magnetic poles forming the magnetic circuit and in some the number of paths may be less than the number of poles. Space will not permit a discussion of these various types, and the reader should make use of a book devoted entirely to armature windings if he cares to investigate the many possible types.

Simple Drum Armature

In the case of the ring armature, the wire forming the winding is wound on a wire ring, while in the *drum* armature the winding is placed around a cylinder of iron. The drum armature has a decided advantage over the ring armature in that more of the wire used in the winding has an electrical pressure induced in it. In the ring winding the part of each turn of wire inside the ring has practically no electrical pressure induced in it, and as a result only the part of each turn on the outside of the ring is effective in producing an electrical pressure. In the drum winding, both sides of each turn are on the surface of the armature and have an electrical pressure induced in them.

That part of an armature winding in which the electrical pressure is induced is called an *inductor* and there will be as many inductors in a ring winding as there are turns, while in a drum winding there will be twice as many inductors as there are turns.

Electrical Pressure Induced in Armature Winding

The electrical pressure induced in an armature winding will depend upon the rapidity with which the magnetic lines of force are cut by the inductors composing the winding. The magnetic lines of force cut by each inductor in one revolution is equal to the product of the number of magnetic poles forming the magnetic circuit and the magnetic lines of force entering or leaving the armature at each pole.

The number of magnetic lines of force cut by each inductor in one second will be equal to the product of the lines cut per revolution and the number of revolutions per second.

The electrical pressure induced by the armature winding will depend upon the manner in which the inductors forming the winding are connected, that is, whether there are two circuits through the winding, four circuits, etc. The number of inductors in series in

each circuit is equal to the total number of inductors divided by the number of paths through the winding, and the greater the number of inductors in series the greater the induced electrical pressure, all other things remaining unchanged.

If the lines of magnetic force cut by each inductor in one second be multiplied by the number of inductors in series the product will be equal to the total lines of magnetic force cut by all of the inductors in series in 1 second. This total number of magnetic lines of force cut by all of the inductors in series divided by 100,000,000 gives the electrical pressure in volts, induced in each path of the armature winding.

The only two factors which may be changed after the machine is constructed are the magnetic lines of force per pole and the revolutions of the armature. If the number of magnetic lines per pole remains constant, the induced pressure will vary directly as the speed of the armature. Likewise, if the speed remains constant the induced pressure will vary directly as the number of magnetic lines of force per pole.

It is by varying the speed of the armature or the number of magnetic lines of force that the output of a generator as to voltage is regulated. This will be explained later.

Series, Shunt and Compound Generators Form the Subject of the Next Installment of the Electrical Equipment of the Motor Car.

New York's Perfection Spring Service Plant

Station Is Equipped for Any Size of Car or Truck

A NEW standard in service for motor vehicle spring users has been set by the Perfection Spring Co. in opening what may be called the first complete spring service plant in New York. Housed in a three-story building which will eventually be increased to five, designed especially to meet the requirements of an ideal spring service station, the new plant of the Perfection company is of particular interest.

The service work is designed to not only take care of individual owners but also to lend a helping hand as far as springs are concerned to the motor car repair and service shops in the vicinity. There is nothing in the way of motor car springs which cannot be handled quickly and efficiently in this shop because it is not only supplied with a large amount of stock springs for standard models, but is also in a position to manufacture springs of obsolete models or of special cars.

Service Is First Consideration

An interesting feature of the plant is that it is entirely self-supporting. It is equipped with its own heat-treating plant, pyrometer, testing machinery, etc., and in the hands of men who are familiar with the methods and standards of workmanship of the home plant in Cleveland, hence, the work done in the main factory can be duplicated in this combination service and manufacturing plant. Primarily, however, the building has been laid out for service with manufacturing as a secondary consideration, although nothing has been neglected to make equipment for the latter complete.

There is no truck too large nor roadster too small to be taken care of in the shops, and owing to the fact that the building has been laid out particularly for spring work there are a number of facilities which permit the workmen to operate at a great advantage and hence reduce to a minimum the length of time spent on any job. Perhaps the most noteworthy feature in this respect is the use of bays in which the cars are run over a long, deep pit on tracks formed of built-up H-beams. There are twelve of these bays, nine being designed for touring cars of any size and three for trucks of any capacity. The width of the track of some of these bays is adjustable and cars other than of standard tread can be handled just as readily as those with the 56-inch span.

The area of each floor is 75 by 100 feet, with a wide aisle down the center, and on the first floor the bays are arranged six on a side. As a car enters the door which is in the center of the first floor, it is stopped opposite the office and the necessary job tickets, etc., arranged. The car is then immediately swung around on a combination truck and jack and pushed on to the H-beam tracks over the pits. The men are then free to work on it and if the car has been built any year after 1909 the stock spring will probably be found in the stock storage room of the plant. In case of an odd spring or an odd leaf it can be made in quick time in the shop.

With the cars on the bay the workman has the spring at about shoulder height and is therefore able to accomplish the work in much handier style than if he were compelled to labor in a stooping position or lying on his back. This ararngement for the convenience of the workmen has its reflection in the time on a given job and also permits of much greater care in setting up bolts on spring clips and other parts which are very often located so inaccessibly that it is difficult to properly adjust them.

Above each of the bays supported by overhead I beams are chain hoists. These are capable of lifting any of the cars which enter the shop and are graduated according to the size of the bay. The smallest bays have H-beam tracks which are 9¼ inches wide. The track beams for the large trucks are 30 inches in width and the overhead hoisting apparatus is graduated in much the same way. The tread distance from center to center on the touring car tracks is 56 inches and for the trucks it is 70 inches normally, although adjustments can be made as stated for variation of the tread.

In order to take care of the trucks fitted with very high bodies the ceiling height of the first floor is 16 feet and as the maximum truck height is close to 14 feet this leaves 2 feet for exceptional circumstances. The elevator is also of large size, the dimensions being 27 by 12½ feet. On the second floor the supports have been arranged especially to take care of the heavy loads of spring stock. The capacity of the floor is 250 pounds per square foot. The idea of placing stock on the second floor is that eventually when municipal improvements have been made this will be on a level with the elevated freight lines which have been planned for.

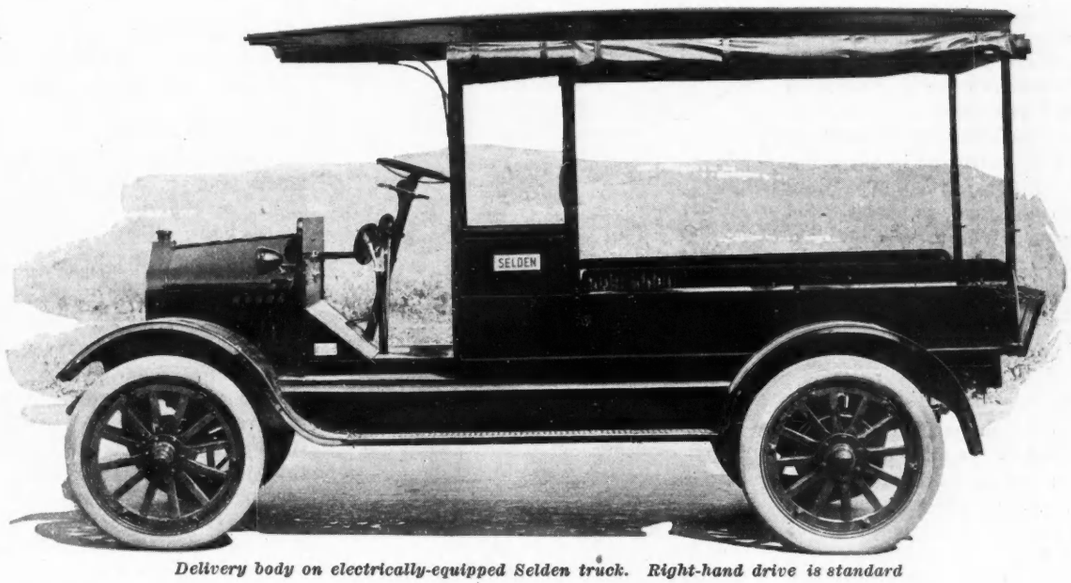
Shop Layout Well Planned

One of the interesting parts of the layout is the shop. This is on the first floor behind the main room containing the bays. It occupies a space of 50 feet across and 22 feet deep. At one end are two heat-treating furnaces and pyrometers fully equipped to provide the same delicacy of control as is used in the home plant of the Perfection company in Cleveland. The workmen are familiar with the heats used in the Cleveland plant so that a finished spring produced in New York has the same materials and the same heat treatment as it would have had it come from the home plant. Behind the heat-treating furnaces are the dipping baths so that a workman operates between the furnace and the bath, being free to take the materials from the furnace and emerse them immediately in the heat-treating oils. The machines necessary for shearing the spring material, grinding the leaves, wrapping the eyes and doing other necessary machine work in the process of manufacture are all operated by individual motors supplied by current taken from the public service lines. The fuel used in the furnaces is gas which is also piped into the building from the outside lines.

For spring testing there is a Tinius Olsen machine which is capable of handling the heaviest springs. Outside of the individual inspection given to each spring blade the entire spring can be inspected and tested on this machine.

Standard Units in Selden Truck

Electrical Equipment Offered for Additional Cost of $80—Worm-Drive Axle



Delivery body on electrically-equipped Selden truck. Right-hand drive is standard

THE new model G Selden truck, manufactured by the Selden Motor Vehicle Co., Rochester, N. Y., is of conventional design in every particular, being made up of standard units which embody the latest ideas in truck design. To supply the demand for electrically equipped trucks the company offers a starting and lighting system with combined oil and electric side and tail lights at an additional cost of $80.

The motor is a four cylinder, block-cast type built in unit with the gearset. It has a bore of 3⅛ inches and a 4⅛-inch stroke with a maximum speed of 1,200 revolutions per minute controlled by a sealed governor. The setting is made at the factory and is non-adjustable. Ignition is by high-tension magneto which is driven at camshaft speed. The motor is cooled by thermo-syphon circulation through a vertical-tube radiator which is assisted by a pressed-steel fan.

The gearset has three speeds forward and a reverse with gears and shafts of ample proportion made of heat-treated nickel steel. Connection with the motor is made through a multiple-disk clutch integral with the gearset. Drive is through two universals and a 2-inch tubular propeller shaft.

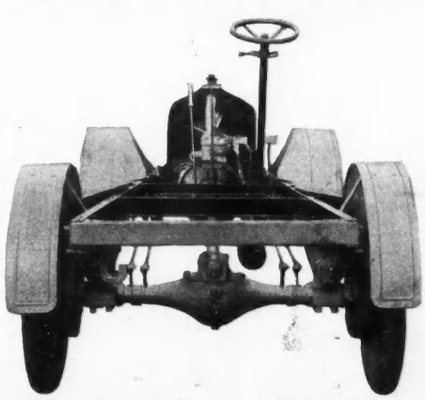
A Sheldon worm-drive axle is utilized in the rear. This is the David Brown type of semi-floating construction. Both service and emergency brakes are operated on drums on the rear wheels. The front axle is an I-beam forging 1⅝ inches by 2 3/16 inches, with steering knuckles of 3½-per cent nickel steel. A worm and nut type steering gear is used with a 16-inch wheel, right-hand drive.

The frame is a pressed steel channel section, 4 inches deep and is 30 inches from the ground when the truck is loaded. The car is so arranged that there is an available loading space of 6½ feet back of the driver's seat.

Front springs are 38 inches long by 1¾ inches wide and on the rear are 2-inch springs with a length of 48 inches. The rear springs take the torque and drive through the Hotchkiss principle. The tread is 56 inches in the front and 58 in the rear.

The governor regulation which holds the motor speed at 1,260 revolutions per minute allows a maximum car speed of 20 miles per hour. Speed change is located in the center of the driver's compartment.

There is a 15-gallon gasoline tank provided, and the stock job has three oil lamps for regular equipment. The chassis weighs 1,900 pounds and equipped with express body 2,600 pounds. Tires are 32 by 3½ on the front and 33 by 4 on the rear. The wheelbase is 110 inches.



Rear view of the new Selden showing worm-drive axle

UNION PRODUCTS COMPANY

Rockford, Ill., Sept. 29—The Union Products Co. has been organized here with $200,000 capital and will manufacture, among other car parts, a piston ring patented by D. D. Shierk. Exclusive manufacturing licenses have been obtained by the company on six issued patents and four that are pending covering the manufacture of wire wheels. Officers of the new company are: President and general manager, A. H. Martin, formerly vice-president and sales manager of the Burd High Compression Ring Co.; vice-president, M. R. Harned; secretary, H. F. Norris; chief engineer, W. E. Williams, consulting engineer of the American Steel Foundries.

INTERSTATE MOTOR TRUCK LINE

New York, Sept. 30—The New York and New Jersey Express Co., has been organized to do a general haulage business by motor trucks between this city and New Jersey points within a radius of 20 miles. The project is the outgrowth of the great increase of manufacturing in nearby cities including Newark and Elizabeth, whose outlet for export has been limited by railroad congestion. The company plans to put into operation 104 heavy trucks, contracts having been signed for hauling 55,000 tons of goods per month.

The Accessory Corner

Piston Ring a Metal Packing

UNION piston rings are made from individual castings of grey iron and the scale of the castings is retained in the ring to give the maximum amount of resiliency. The union is best shown in the illustration on these pages. The rings are ground to exact measurements after the union is inserted to obtain a perfect fit in the cylinder. Because of the method of sealing the joints with the uniquely constructed union it is claimed that these rings cannot leak. They are being marketed by the recently organized Union Products Co., Inc., Rockford, Ill., of which company, A. A. Martin, a veteran in the leakless piston ring business, is the president.

Tire Reinforced Against Blowout

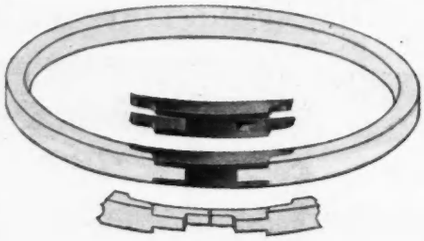
Two fabric reinforcements of breaker strips are inserted in the sides of the new Amazon tire at the spot where blowouts usually occur. It is claimed that this added feature greatly lengthens the life of the tire. The tread is pure black and around the side is a pure white strip which is added to give the tire individuality and enhance the appearance of the car. The Amazon Tire & Rubber Co., Akron, O.

Tire Safety Valve

The auto tire safety valve means to a motor car tire what a safety valve means to a locomotive boiler, or any other container of high fluctuating pressure. The principle, the valve, the material and the results are the same. It fits in place of the ordinary valve cap. With new tires the user adjusts the instrument to about five pounds above the average pressure he wishes to carry and in weak tires to about five pounds above the lowest pressure that can be carried without rim cutting. The valve automatically relieves the extra pressure, or over inflation caused from any source, at the moment such conditions arise, as previously stated, in the same manner that a steam safety valve operates. The glass-covered dial face, which is plainly visible at all times, registers the exact amount of pressure the tire is carrying. If there is a slow leak in the tire the dial hand will indicate it.

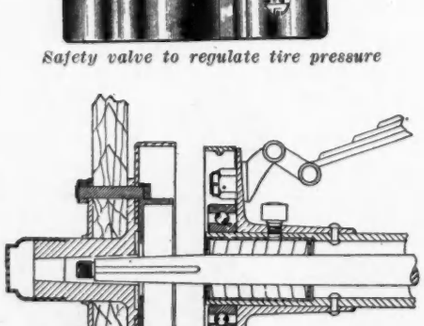
Auxiliary Bearings for Fords

The Hercules bearing carries the Ford rear-axle load on the wheels and housing of the rear axle, instead of on the axle shaft as in the standard practice. It consists of two combined radial and thrust bearings said to be capable of carrying a load of 3,800 pounds at axle speed. These bearings are mounted on the outer end of the Ford rear-axle housing and engage a steel bracket which is fitted onto the inside of the brake drums. These brackets are held in place by means of six special bolts, which are fitted in place of the bolts regularly furnished for bolting the brake drum and hub flanges to the wheels. When the wheels are in place on the axle shafts the steel bracket which is contained in the brake drum engages the auxiliary bearing, thus carrying the entire load on the axle housing and wheels. The device is particularly advised for use in standard Ford cars, which have been converted into trucks, and it is claimed that with the use of this equipment wabbly wheels are a thing of the past. They are manufactured by the Auxiliary Bearing Works, 327 South La Salle St., Chicago.



Above—Non-leaking piston rings ground after assembling. Below—Tire reinforced against blow out

Safety valve to regulate tire pressure



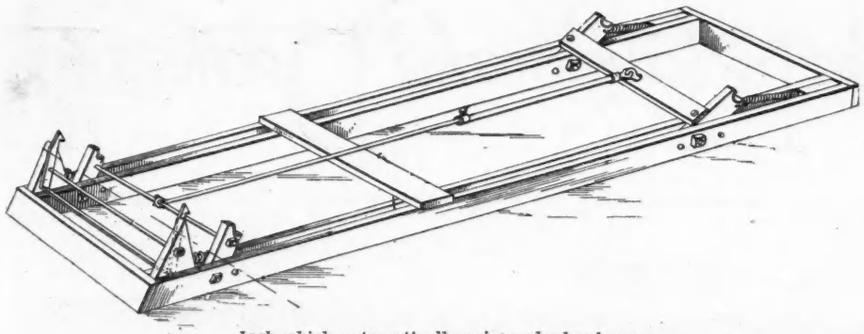
Auxiliary bearing for Ford rear axle

Carbureter With Few Parts

The Shain ball spray carbureter has no float, needle valve, multiple jets, atmospheric wells or compound nozzles. The ball valves, or sprayer, visible in action through a glass cylinder, revolves due to the pressure of the fuel under it and the suction of the pistons of the motor from above. It throws a thin spray or film of fuel outwardly, which the air, sucked up at high velocity through the calibrated air ports of the carbureter, vaporizes. Several of the air ports in the body of the instrument are threaded for air plugs and the makers furnish data for determining the air and fuel required. The fuel supply is through nozzles with holes in their centers of various standard drill sizes, which screw into the top of the removable screened plug in the bottom of the carbureter. Through the hole in the selected nozzle, the fuel flows to the opening under the ball. The screened plug containing the nozzle may be removed for cleaning or changes in the flow of fuel. The ball valve automatically shuts off the fuel when the engine stops. Attached to the baffle plate is a tilting bar which unseats the ball, on suction coming from the engine. In the lower compartment of the instrument is a suction air plate which rises and falls with the suction. All operating parts are visible through glass. The price for Ford size, 15/16-inch outlet and 1 3/16-inch outlet is $10. The carbureter is marketed by Charles D. Shain, Station L, Brooklyn, N. Y.

Jack Automatically Raises Wheels

A patent has been granted for a garage jack which operates when the car is driven onto it, automatically lifting all four wheels from the ground. Of course, its purpose is to act as a tire saver by keeping the weight off the tires when the car is not in use, and to permit removal of all wheels or any one for repairs. The inventor plans to market the device in a form which will be adjustable for use on any make of car. In its simple form, it is a platform placed on the garage floor with two horses connected together by an



Jack which automatically raises wheels of car

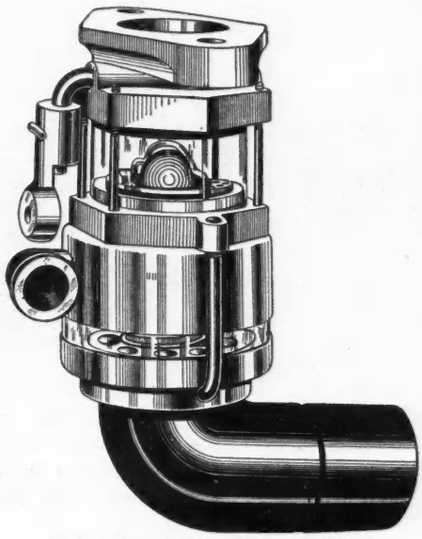
adjustable bar. The legs of each horse are hollowed out to take the axle. As the car is driven on to the jack the front axle catches into both legs of the front horse and the rear wheels drive the legs forward and lift the wheels from the ground. Then the apparatus is so balanced that, at the moment the front legs pass beyond the straight up and down position, the rear legs engage the rear axle. The momentum of the front of the car, on the horse legs, passing beyond the up and down point lifts the back wheels off the ground. There is a spring on the front of the rod which connects the two horses which allows the front legs to go up to the straight position without lifting the back legs. This is adjustable so that the device may be accurately balanced. When all four wheels are off the ground a ratchet engages to lock the device in position. A lever is provided whereby a touch of the foot releases the ratchet and allows the car to drop down to the floor again. Ernest C. Townley, Allenville, Ill., is the inventor and holds the patents.

Truck Converting Units

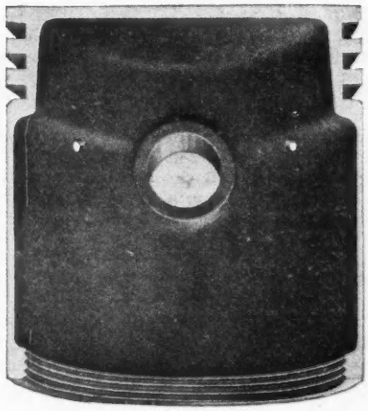
The working principle of the Olson converting units is to take the load from the Ford construction and deflect this direct to the wheels. The construction is designed to relieve strains on the frame, axle and differential and permit the mounting of larger bodies, as auxiliary springs in the form of full platform suspension take care of the overhang and prevents the rear end from sagging when loaded. The ½-ton capacity units can be attached to a Ford without removing a single member of the car's standard construction. Auxiliary yokes bolt onto the inside of the regular Ford housing and the auxiliary spring pivot on spring pins fastened to brackets which are a part of this yoke. The shipping weight of the complete unit is 116 pounds and the price $30. The attachments are being marketed by the Swedish Crucible Steel Co., Detroit.

Oiling Device for Ford Motors

The Evapco distributer is built up of steel and consists of a series of inclined troughs combined to form a single unit and mounted inside the crankcase. The oil splashed from the connecting-rod pockets is caught by the troughs of the distributer and carried back, step by step, to the main reservoir at the rear. This movement of the oil is said to prevent accumulation under the cranks and insures uniform lubrication under all conditions. Simple directions are given showing how to bolt it onto the right side of the crankcase, utilizing the bolts that are used to hold the oil pan in place on the motor. The device was invented by E. M. White, a lubrication specialist, and is being marketed by the Evapco Mfg. Co., 427 Grand River avenue, Detroit.



Carbureter without float chamber or needle valve



Section of light weight semi-steel piston

Semi-Steel Piston of Light Weight

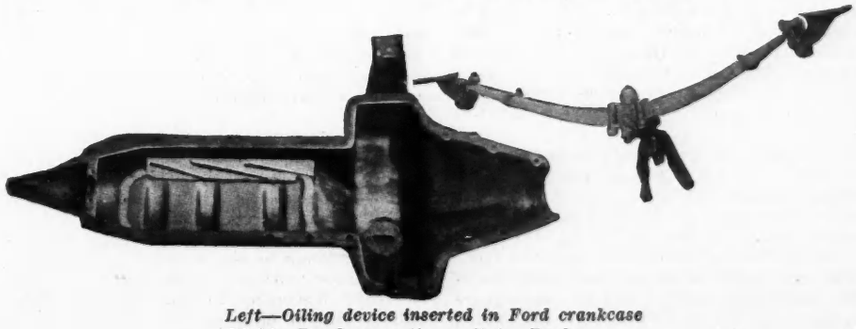
Allen & Curtiss Co., Mishawaka, Ind., which concern specializes in reboring cylinders and fitting new pistons, is offering a semi-steel piston of the same weight as aluminum alloy. The one illustrated in section is a Buick piston and weighs only 1 pound 11 ounces. These pistons are cast from metal patterns. As will be noted they have a very thin wall, but it is claimed that the characteristics of the metal are such that, even with the thin wall, the pistons are amply strong.

Valve-Grinding Equipment

The Auto Parts Co., Providence, R. I., maker of the Apco specialties for the Ford car, is offering a valve grinding equipment that is complete in every respect. It comprises an Apco valve spring remover, a grinding tool and a large can of carborundum, which is well known for its abrasive action. The combination of three articles is to be retailed at 60 cents. Another new specialty is the Apco clutch control. It is a simple device that can be attached to the brake pedal in a few minutes with a screw driver and a wrench, and with it the operation of the service brake throws the clutch in neutral. This prevents the brake working against the motor, thereby effecting a saving of the brake lining. The device is of particular service to the new driver as well as a convenience to the expert. It sells for 30 cents.

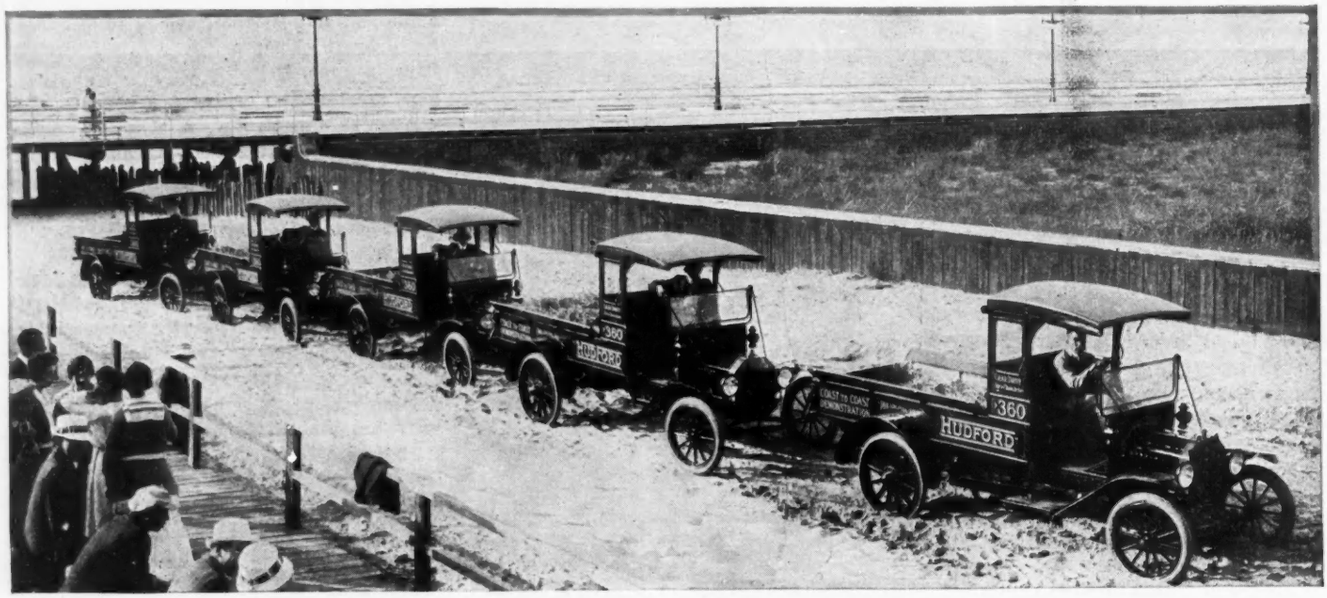
Hand Signal Lamp

An electric hand lamp to make the extended hand of the driver an effective signal at night is made by the Pittsburg Electric Specialties Co. It is held to the back of the hand by an elastic and receives current from the dash socket. The lamp is 2 candle power and is held in a nickle case 2 inches in diameter, 1 inch thick, with a ruby bullseye 1 inch in diameter. As very little current is required the lamp is left lighted and ready for use in any emergency.



Left—Oiling device inserted in Ford crankcase
Right—Truck-converting unit for Ford

Among the Makers and Dealers



HUDFORDS ON DEMONSTRATION TRIP — This is the start of a tour of the United States and Canada to instruct 480 demonstrators of the Hudford. It marks the initial step in a selling campaign and began with a baptism of the Hudfords in the Atlantic ocean. The Hudford unit attached to a Ford chassis weighs less than a ton and carries more than a ton. It has no transmission gears and is easy to drive. This illustration marks the beginning of a new sales campaign.

ADDITION After 2 Months' Business—The Twin-City Four Wheel Drive Co., St. Paul, Minn., has begun erection of a two-story addition, 120 by 175 feet, to the factory which it opened 2 months ago. The structure will be completed in 40 days.

Reo Erecting Shops—Work is now rapidly progressing upon the new machine shops of the Reo Motor Car Co., part of which will be three stories high, 407 feet long and 175 feet wide.

Agent in Four Counties—The Ideal Auto Manufacturing & Sales Co., Fort Wayne, Ind., has secured the agency and distribution of Maxwell cars for four counties in northern Indiana: Wells, Adams, Allen and Whitley.

Milwaukee Ford Dealers Build—The Auto Mart, Milwaukee, recently appointed Milwaukee dealer for the Ford, is erecting a large garage, service station and supply and accessory store on Wells street, between Fifth and Sixth streets. It will be 65 by 135 feet in size, two stories high.

Three Additions in 2 Years—The Apperson Bros. Automobile Co. moved its machine shops into a new building that has been in process of construction for several months. The structure is the third large addition to the plant that has been built in two years and has 90,000 square feet of floor space, offering double the manufacturing facilities of the old.

Green Bay Attracts New Company—Green Bay, Wis., probably will be the new home of the Pearson Engine & Mfg. Co., Boston, Mass., manufacturer of internal combustion engines designed by Fred H. Gile, Boston. The company is negotiating with the business men's association at Green Bay for a site. The plant would entail an expenditure of $50,000 to $75,000 and employ 100 skilled workmen at the beginning. The product is to be marketed principally for the tractor and other heavy duty trade, being designed to utilize the heavier distillates of petroleum. The concern is capitalized at $300,000.

Hall Goes to Pathfinder—D. K. Hall last week was appointed director of service of the Pathfinder Automobile Co. He had been head of the complaint department of E. C. Atkins & Company, saw manufacturers, of Indianapolis, for 20 years.

Chain of Garages Extended—C. B. DeLong, of Fithian, Ill., will open a new garage in Ogden, Ill., and will do a general repair business. De Long has a string of garages located in Georgetown, Allerton, Sidell and other points in central Illinois.

Body Builders Expand—Millspaugh & Irish, Indianapolis car body manufacturers, last week moved their plant to a new factory location five times larger than the old. The company recently designed and built the racing bodies now being used by the Premier Motor Car Co. of Indianapolis.

Makes Specialty of Car Bodies—The J. S. Morris Co., Waupun, Wis., builders of carriages and vehicles, is now specializing in the manufacture of special motor car bodies, such as hearses, limousines, coupes and other types. Several hearse bodies were delivered during last week and order for similar bodies are on the books and will require maximum production of 5 to 6 months to fill.

Cotta Transmission Co. Expands — The Cotta Transmission Co., Rockford, Ill., has purchased 100,000 square feet of land upon which a new factory will be erected. The present plant is to be abandoned. The great increase in the demand for trucks and resultant growth in the demand for transmissions, force expansion. The new plant will be ready November 20 and will have 27,000 square feet of floor space. At present the company is employing 100 men. The new plant will employ twice this number. T. D. Reber is president; A. D. Scoville, secretary-treasurer, and E. P. Reber, general manager.

Racine Tire Adds to St. Louis Force—The St. Louis-Racine Rubber Co., St. Louis, announces that C. R. Gugenheim, G. P. Felty and T. C. Setzer has been added to the staff to sell Racine tires in Missouri and St. Louis.

Investment Co. to Build Garage—The Reliance Investment Co., Milwaukee, has awarded contracts for the erection of a garage and repair shop costing $15,000. It will be 30 by 100 feet and of fireproof construction.

Willard Battery Experts Engaged — The Battery Service Co., St. Louis, announces that J. H. Freeman and B. N. Edwards, battery experts from the Willard factory, have charge of the new service station opened by that company.

Myers Co. Making Deliveries—The Myers Machine Co., Sheboygan, Wis., which was reorganized several months ago to purchase the Wisconsin Motor Truck Co., Baraboo, Wis., and consolidated the plant with the general machinery works at Sheboygan, Wis., is now making regular deliveries of the Wisconsin motor truck to the trade. New equipment and other facilities have been provided for a considerable output, and already the concern is behind on its orders.

Home-Coming for Buyers — The E. B. Prouty Automobile Co., Richland Center, Wis., Ford distributer, conducted a home-coming last week. Every purchaser of a Ford dealing with the Prouty company was invited to drive to Richland Center and be the guest of the concern for a full day. A program of races, games, entertainment for the women, and two baseball contests was staged. At noon a big country dinner was served in the Prouty garage. The event was attended by more than 700 persons. The

Prouty company intends to make the event an annual affair.

All-Steel Tractor Plans—The Advance-Rumely Company, Laporte, Ind., is experimenting in the manufacture of an all-steel tractor. Heretofore considerable wood has gone into the construction of tractor bodies.

Marathon Doubles Capital—At the annual stockholders' meeting of The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio, it was voted to increase the capital stock from $500,000 to $1,000,000. Sales for this year are 70 per cent greater than last.

Expansion Outstrips New Buildings—As soon as the Falls Motors Corp., Sheboygan Falls, Wis., completes work on the new assembly and motor repair shop begun September 18, it will undertake several other important works extensions made necessary by the constantly increasing demands from motor car builders. So urgent is the need for facilities that assembly work is being carried on in canvas tents and wooden shelters pending the completion of the more substantial structures.

Louisville Companies Promote Men—W. I. Shaw, who has been sales manager of the Kentucky Wagon Mfg. Co. and the Dixie Motor Car Co., Louisville, Ky., has been made general sales manager of these companies. Stephen K. Miller, who has been assistant sales manager, is promoted to sales manager of the wagon department. Frank H. Holman has been appointed sales manager of the gasoline truck department. A. B. Challinor will become sales manager of the passenger car department.

Borg & Beck Patents Clutch—The Borg & Beck Co., Moline, Ill., has let the contract for a new building adjoining their present plant. The new structure will be 150 by 150 feet, and will be fireproof. It will be devoted exclusively to the manufacture of an improved clutch of Borg & Beck patent. The clutch has been adopted by a large number of the leading motor car, truck and tractor manufacturers, and the demand has been beyond the capacity of the plant. It is planned to place the new building in service about January 1.

Kellogg Pumps Adding—The Kellogg Mfg. Co., Rochester, N. Y., maker of engine-driven tire pumps, has let contracts for a new building 100 by 50 feet, three stories high.

Reo to Help Employes Invest—To help its employes, of which there are now 5,000 on the pay roll, the Reo Motor Car Co. and the Reo Motor Truck Co. are planning to open a clearing house in the welfare department, where employes having real estate and personal property will be able to list these and have the clearing house take care of sales or purchases they may desire to make.

Doak Leaves St. Louis Agency—Ralph R. Doak, St. Louis, manager of the Woods Electric Vehicle Co. of that city, has been made sales manager of the Ohio Electric Car Co. of Toledo, and will make his home in that city. Harold K. McCarthy, St. Louis, assistant manager in St. Louis, has been made manager to succeed Doak. He has been with the company 4 years.

Auto Parts Co. to Add—B. E. Thompson, president and general manager of the Metal Auto Parts Co., manufacturer of metal parts for motor cars, has announced plans for the erection in Indianapolis of a one-story brick building to cost $80,000. The new plant will cover about 4 acres of ground and contain about 100,000 square feet of space. A small building will be erected for an enameling plant that will contain twenty ovens.

New Tractor Company—The Agrimotor Engineering Co., LaCrosse, Wis., has been organized by C. W. Levis, for many years sales manager of the LaCrosse Plow Co., to engage in the design of tractors, farm implements and accessory lines. Mr. Levis has been elected president and manager of the new concern, which will make a specialty of marketing both patented and unpatented implements or parts, and serve as agents for patentees and attorneys. In its agency capacity the company will endeavor to arrange for the manufacture of implements or attachments which have merit.

Pathfinder Again Has St. Louis Agent—The Locust Motor Sales Co., St. Louis, has taken the agency for the Pathfinder cars.

Michigan Foundry Adds—Two buildings, one 100 by 300 feet, and the other 60 by 80 feet, are being added to the plant of the Michigan Malleable Foundry Co.

Denmo Gains St. Louis Agency—The Denmo Sales Co., St. Louis, has been organized to sell Denmo trucks in St. Louis and vicinity. This truck has not been represented there before.

Liberty Appoints Salesmen—The Liberty Motor Car Co., Detroit, is adding to its force of traveling men, and among the recent appointees are A. W. Franklin, formerly sales manager of the Albany Garage Company, Albany, N. Y., eastern representative; Nicholas Hall, formerly of Hall Bros., and D. C. Reeves, Kansas City, southwestern representatives.

Spring Power vs. Electric Battery—If car manufacturers used springs instead of electric systems to start their cars they would have to use a spring weighing 1,700 pounds to obtain the same power as is contained in a battery weighing only 1 pound. If a tank of gas or air were used the tank would have to weigh 400 pounds or it could not deliver the same power as a 12-ounce battery.

Carbureter Company Buys Plant—The H. & N. Carbureter Co. has purchased a new and completely equipped plant at 138 West avenue, Long Island city, close to the Queensboro bridge. The company will maintain and enlarge its service station, but the main office and retail sales department will remove from 1790 to 1675 Broadway, New York. The company has branches in Boston, Philadelphia, Los Angeles and Detroit, besides agencies and service stations in the larger cities of the country.

Columbus, Ohio—Ortman Motor Co.; capital stock, $25,000; incorporators, F. Ortman, H. B. Dahl, D. S. Craig, Will M. Campbell.

Chicago, Ill.—Midland Auto Co., to deal in motor cars; capital stock, $10,000; incorporators, Edgar B. Cahn, Harry Goodman and William R. Swissler.

Columbus, O.—Springfield Motor Car Co.; capital stock, $10,500; incorporators, C. F. McGilvray, H. G. Wiley of Dayton, U. F. Huffman, G. S. Kaup.

Cleveland, Ohio—Hess-Strayer Auto Service Co.; capital stock, $10,000; incorporators, Harry Hess, H. J. Strayer, C. D. Hess, H. F. Strayer and T. D. Lamb.

Cincinnati, O.—Economy Tire Co., to do a general tire business; capital stock, $10,000; incorporators, William J. McCauley, Julius H. Davis, H. M. White, Frank H. Cross and R. E. Simmonds Jr.

Columbus, O.—Autoped Sales Co., to deal in autopeds; capital stock, $10,000; incorporators, Charles Zimmerman, Joseph F. Martter, Walter B. Zimmerman, Orr S. Zimmerman and W. R. Pomerene.

Dover, Del.—Crowther Motors Corp., to engage in the manufacturing and sale of motor cars; capital stock, $5,000,000; incorporators, W. F. R. Hansell, Geo. H. B. Martin and S. C. Seymour.

Dallas, Tex.—Randal Adams Auto Co.; capital stock, $10,000; incorporators, H. O. Adams, R. M. Handal and Mrs. Rama Adams.

Detroit, Mich.—National Automobile Owners Supply Co., to deal in motor car supplies; capital stock, $10,000; incorporators, Sylvian S. Grosner, Joseph S. Burak and Roscoe C. Griffith.

Detroit, Mich.—Wise Electric Sherardizing Co., sherardizing, plating, polishing and buffing of metals and the manufacture of motor car parts and accessories; capital stock, $15,000; incorporators, Charles L. Backus, R. E. Baus, Maxwell, M. Wise.

Detroit, Mich.—Eisenman Pump Co., to manufacture pumps and motor car accessories; capital stock, $25,000; incorporators, A. M. Spurk, William Eisenman, May Eisenman.

Trenton, N. J.—Lakewood Motor Company, to deal in motor vehicles, $10,000; incorporators, Pitney C. Havens, John M. Comine, Arthur Vanschoick, W. Durward McCloskey.

Fairmont, Minn.—The Fairmont Universal Garage & Manufacturing Co., to make motor cars, etc.; captial stock, $50,000; incorporators, J. A. Nightengale, O. B. Follette and G. W. Sherwood.

Indianapolis, Ind.—Indianapolis Motor School, training in motor study; capital stock, $5,000; incorporators, Q. G. Nobilitt, F. H. Sparks, H. W. Stanton.

Indianapolis, Ind.—Hoosier Tire Company; capital stock, $10,000; incorporators, Mrs. E. M. Fife, W. R. Fife and E. H. Fife.

Jackson, Mich.—Cotton-Zeigler Garage Co.; capital stock, $10,000; incorporators, George L. Cotton, Christian P. Zeigler and Burr M. Peek.

Kansas City, Mo.—Pullman Motor Sales Co., to deal generally in motor cars and accessories; capital stock, $5,000; incorporators, Lynn Webb, H. C. Leedy and George W. Compton.

Lorain, Ohio—Goodyear Rubber Co.; capital stock, $500,000; incorporators, A. E. Beechel, W. E. Derr, L. S. Grim, Charles W. Scrimshaw and B. W. Rote.

Lakewood, Ohio—Riverside Taxicab Company; capital stock, $1,000; incorporators, W. Hamushek, S. J. Friedman, Frank L. Miller, R. Bigham and E. C. Warner.

Milwaukee, Wis.—Jessen Auto Equipment Co.; capital stock, $4,000; incorporators, H. Jessen, A. H. Jessen and H. W. Kittredge.

Milwaukee, Wis.—The Intersection Garage Co., 1918-1920 North avenue, to operate a garage, deal in new and used cars, make repairs, etc.; capital stock, $3,000; incorporators, E. C. Droegkamp, E. A. Bartson and H. J. Lear.

Mt. Clemens, Mich.—Chase-Reynolds Co., to deal in motor cars and supplies; capital stock, $5,000; incorporators, Albert V. Chase, William Reynolds and W. C. Strosser.

New York City—Automobile Securities Corp., to deal in motor cars, accessories, etc.; capital stock, $100,000; incorporators, C. R. Allison, P. Lacroix and W. L. Glover.

New York City—The Daily Motor Co., 37 Wall street; capital stock, $50,000.

Nashville, Tenn.—Rutherford Auto Co., to buy, sell and repair motor cars; capital stock, $10,000; incorporators, A. G. Rutherford, D. E. Rutherford, D. E. Rutherford, J. W. Rutherford, C. H. Rutherford and E. R. Rutherford.

Philadelphia, Pa.—Pratt and Moser Motor Co.; capital stock, $25,000.

Phoenix, Ariz.—Overland-Arizona Co., to buy and sell motor vehicles; capital stock, $100,000; incorporators, J. H. Huntsman, H. H. Hotchkiss and F. W. Pitcher.

Richmond, Ind.—Talcott-Overland Co.; capital stock, $10,000; incorporators, Clarence C. Talcott, Howard J. Steinkamp, William L. Wessel, Byram C. Robbins and Will W. Reller.

St. Paul, Minn.—The Roberts Motor Co.; capital stock, $50,000; incorporators, H. L. Zacariah and Minerva Roberts.

Salt Lake City, Utah—Auto Transfer and Service Co.; capital stock, $2,500; incorporators, H. C. Bigelow, J. W. Farnsworth, George F. Ahlberg, A. F. Pierce and Harry W. Beckett.

Springfield, Ill.—Tire Service Co., to handle tires and conduct a public garage; capital stock, $5,000; incorporators, E. G. Mitts, P. H. Stewart and L. L. Bingham.

St. Paul, Minn.—The National Protective Device Co., to make bell protections for motor cars; capital stock, $50,000; incorporators, P. H. Gottfried, J. M. Skog and J. E. Silber.

St. Louis, Mo.—Lafayette Motor Car Co., to manufacture, sell and deal in motor cars and accessories; capital stock, $5,000; incorporators, Milton B. Strass, Wilson H. Anderson, Jesse A. Wolfort.

Tucson, Ariz.—Byrns-Ray Cadillac Co., to buy and sell motor cars, trucks, supplies and accessories and to establish and maintain service stations in Arizona; capital stock, $95,000; incorporators, B. M. Ray and Bob Byrns.

Topeka, Kan.—Trefry Motor Co., capital stock, $5,000; incorporators, W. H. Trefry, A. B. Eisenhower and L. Hodgins.

Wilmington, Del.—Champion Spark Plug Co.; capital stock, $1,000,000.

Wilmington, Del.—Darling Motor Co.; capital stock, $300,000; to manufacture motor cars, etc.; incorporators, George W. Dillman, M. M. Dugan, J. D. Frock.

Warren, O.—Fahrney & Williams Motor Co.; capital stock, $10,000; incorporators, F. D. Williams, Ira S. P. Fahrney, Sara Williams, W. M. Kyser and S. C. Graber.

Wilkinsburg, Pa.—Kuhn-Mutchler Co., to deal in motor cars; capital stock, $5,000; incorporators, Miles H. Mutchler, J. C. Kuhn, W. S. Kuhn.

Washington C. H., Ohio—German Motor Company; capital stock, $25,000; incorporator, H. B. Dahl.

Wilmington, Del.—Wilmington Automobile Co., to sell motor cars and trucks and to maintain a garage; capital stock, $500,000.

From the Four Winds

THESE Children Will Not Lag Now—J. W. Parmley, president of the Yellowstone Trail Association, has offered to lend forty Shetland ponies to boys and girls who have distances to travel to get to school. They must be well cared for and returned May 1, 1917.

Home for St. Louis Mail Cars—Work has been begun here on a garage that will house the 75 cars used by the St. Louis postoffice. The building will be so constructed that it can be enlarged as need arises. The machines have been housed in various private garages heretofore.

Jitney Code Cited—Forty jitney bus operators at Kenosha, Wis., were arrested last week on complaint of the district attorney, who charges violation of the state jitney code, requiring drivers to follow routes and keep hours in their applications for licenses to the state railroad or public utilities commission.

Strikers Harass Dealer—An interesting case, involving the use of a dealers' license plate, came up in the Milwaukee courts last week, when Allton J. March, president of the Milwaukee Automobile Dealers', Inc., and head of the Curtis Auto Co., distributor of the Reo, was arrested on complaint of the leaders of the strike of union machinists. It was charged that Mr. March permitted the Pawling & Harnischfeger Co., crane manufacturer, to use the Curtis company's dealer number plates on cars used to transport strike-breakers to and from the plant at the western edge of the city. The charge was purely technical and part of the tactics of the union leaders to promote a strike for an 8-hour workday.

Car Prevents Railway Disaster—Driving an Overland across the prairie at a 60-mile clip, overtaking an engine running wild, enabling the engineer to leap from the motor car to the engine, was the feat recently performed by Miss Ada Taylor, Tenino, Wash. The engineer and brakemen on the Badger Lumber Co.'s logging train were making a flying switch. The engineer slowed down his train and threw the switch himself. In passing over the frog the jar threw the throttle wide open and the locomotive took the Northern Pacific main line with a full head of steam. Miss Taylor saw the wild engine as it passed her home. She picked up the pursuing engineer, overhauled the engine and kept pace until the engineer was once more master of the situation.

Gasoline Pumps to Be Inspected—The Federal bureau of standards has been investigating gasoline pumps in the larger cities of the country and has found more than half the pumps in New York, Philadelphia, Pittsburgh, St. Louis and Dayton, Ohio, defective and giving short measures. The next investigation to be made is of Illinois public garages, at the instigation of Secretary of State Stevenson, who has drafted a bill providing for state supervision of weights and measures for presentation to the legislature.

Uses Marmon as Stagecoach—Paul Hankavarra of Palmer, Mich., has what he calls a 365-days-a-year Marmon. Palmer is up in the northern end of the state, where it rains and snows oftener than in some other places, and he uses his car as a stage coach to other towns in that section. The first trip was made March 11, 1915. On March 11, 1916, it went out on its trip with the record of never having missed a day during the year. It runs on schedule and is never more than 30 minutes late. When business is heavy it goes as far as 200 miles.

With the Motor Clubs

Batavia, Ill., Club Formed—Car dealers and owners of Batavia, Ill., met this week to organize the Batavia Automobile Club, the object being to enforce traffic rules, erect warning signs at dangerous points and promote the welfare and safety of the owners and occupants of cars and the public in general. Officers were elected as follows: President, W. R. Reaney; vice-president, G. H. Keller; secretary, J. P. Kuhn; treasurer, H. N. Jones.

Indiana Trade Organizes—The Indiana Automobile Trade Association has been formed and will affiliate with the national body soon. An active campaign is to be started to include in its membership local motor trade associations throughout the state. R. V. Law was elected president. Cost keeping, price maintenance, prospects for a garage lien law and the used car problem were discussed at the meeting.

The Show Circuit

Salem, Ore., Show—The motor car exhibit in connection with the annual state fair was much larger this year and more interest was manifested than at any previous show. Leading makes of pleasure cars and trucks were displayed by the Portland, Ore., dealers in Machinery Hall, 125 by 225 feet in size.

Missoula, Mont., Show—More than forty cars are expected in the motor show to be held in connection with the Western Montana fair. The show will be held in a tent on the main display midway of the grounds. L. E. Wood, editor of the Northwest Motorist, is superintendent of the motor show and is being assisted by D. D. Richards, secretary of the Missoula Chamber of Commerce, in preparing for the event.

Minneapolis, Minn., Show—The new factory of the National Lamp Co. of Cleveland in Minneapolis is to be the scene of the annual motor show in February. The Armory, used heretofore, requires repairs which cannot be completed in time. The factory has a large building and is adapted for shows, particularly so because the lamp machinery has not yet been installed. The building is on several car lines and on side tracks from which show cars can be unloaded direct into the building.

Providence, R. I., Show—The Rhode Island Automobile Dealers' Association expect to lead the field again in starting the motor show season, and plans have been prepared for its annual show here November 10-18. Percy S. Clark has again been named as manager and he has started preliminary plans to make it a larger show than any previous exhibitions. Because of the many new agencies placed here recently the exhibition will be more representative of the motor industry than ever.

Springfield, Mass., Show—Plans have been announced for the annual motor show at Springfield to be held at the auditorium durthe week of December 2-9. Harry W. Stacey, who promoted the show a year ago, has engaged the building and prepared plans for the next show. He has had contracts printed and a number of the dealers have requested reservations for double the space they had a year ago. There is to be an open air show here also, for plans were completed recently for a motor car exhibition at the big dairy show at West Springfield this fall, which will attract dairymen from all over the United States. This will not have any connection with the regular motor show at the auditorium, but will give the city two motor shows, an outdoor and an indoor one, within a short period.

Coming Motor Events

RACES

—1916—

October 7—Philadelphia speedway race.
October 7—Omaha speedway race.
*October 14—Chicago speedway race.
October 19—Indianapolis speedway race.
October 21—Track meet, Kalamazoo, Mich.
*November 16—Vanderbilt cup race, Santa Monica, Cal.
November 18—Grand prize race, Santa Monica, Cal.
November 30—Speedway, Los Angeles, Cal.
December 25—Speedway, Los Angeles, Cal.

—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

*Sanctioned by A. A. A.
†A. A. A. championship events for 1917.

MEETINGS

Jan. 9-11—Mid-winter meeting, Society of Automobile Engineers.

SHOWS

October 14-31—Dallas, Tex.
October 15-November 1—Omha, Neb., closed car salon.
January 6-13—New York show.
January 13-20—Montreal.
January 27-February 3—Chicago show.
February 18-25—St. Louis, Mo., show.
February 26-March 3—Omaha, Neb., show.
March 3-10—Boston.
March 6-10—Fort Dodge, Ia., show.

Good Roads Activities

Enthusiast Insures More Good Roads—S. Benson, of Portland, Ore., prominent good roads enthusiast, has agreed to advance sufficient money from his own funds to complete the Delena-Beaver section of the Lower Columbia River highway. After the work is finished the state will reimburse him out of the 1917 levy, without interest.

Prepares for Good Roads Section—Four thousand feet of floor space in the federal building have been set apart by Postmaster E. A. Purdy, Minneapolis, Minn., for a branch office for the public roads section of the department of agriculture, which is to be established.

Black Diamond Route Made Out—Route of the Black Diamond, or Fargo-Duluth route, has been selected as follows: Detroit, Perham, Frazee, New York Mills, Wadena, Staples, Motley, Pillager, Brainerd, Ada Lake, Aitken, Cloquet, Duluth. Each county was levied $4 a mile. A committee was appointed to confer with other highways about a uniform danger sign.